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Would Municipalisation Solve the Milk Problem?

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Mr. President and Gentlemen,

The only reason which occurs to me for my having been invited to address this important gathering is the fact that, having been a Fellow of the Central Association for about twenty years, I do not remember having attended a single meeting until this evening.

Your President, like all good soldiers, is a strict disciplinarian, ever ready to punish offenders who "absent themselves without leave." In doing this he may occasionally also punish those whom he has no desire to injure, and it is precisely this which I am afraid he may have done in asking me to address you this evening.

But although I have been unable to attend your meetings, Mr. President, I have done, in my own interests, the next best thing, for I have always read, with pleasure and profit, the published accounts of your deliberations.

The fact that these have invariably reached a high standard of scientific value only serves to increase the diffidence with which I approach my subject to-night.

The chief reason why I have chosen this particular subject is because I think it is one the discussion of which needs encouragement at meetings of veterinary societies. We are far too modest in advancing our claims to recognition in matters appertaining to Public Health, and I am afraid we are slow in recognising the great possibilities which this work may, in the future, possess for us.

Both in meat and milk inspection the veterinary surgeon is, or ought to be, the most knowledgable man for the work, and it is up to us to secure recognition of this, firstly by maintaining our curriculum at the required level for modern needs, secondly by ourselves taking the foremost position in the discussion of matters relating to our own sphere of Public Health work, and thirdly by not allowing ourselves to be "snubbed."

The gentleman who read a paper on a purely veterinary subject, "The Tuberculin Tests," at the National Milk Conference in 1922, although a medical scientist of great eminence, is not a veterinary surgeon. At the same conference the M.O.H. for Bedfordshire, in discussing "The Production of Pure Milk," suggested that "trained instructors should be employed to demonstrate the simple means by which clean milk may be obtained," adding that "it would be an advantage if these instructors possessed *some* veterinary knowledge and experience." These instructors might perform some useful functions which, however, would not be increased by the possession of that small amount of veterinary knowledge which is as dangerous in the cowshed as elsewhere.

The Public Milk Supply, as regards its production and distribution, always strikes me as one of the most important national problems, concerning which the greatest efforts lead to the least results.

Meetings to emphasise the importance of a pure milk supply are of daily occurrence, the minds of our medical confrères are greatly agitated, successive governments make and re-make laws and regulations, but still, in many parts of the country, the same old dirty milk goes daily on its round.

I admit, of course, that many Local Authorities have tackled the problem in a manner befitting its importance. Especially is this the case in regard to the large industrial centres, most of which have their whole-time veterinary officers, whose duties extend to many of their sources of supply. Most of these large towns, however, still receive large quantities of milk produced under conditions which are usually unsatisfactory and favourable to the conveyance of milk-borne disease.

In the smaller towns and rural areas any attempt to secure supplies of clean, wholesome milk are generally half-hearted and lacking in uniformity. The result is that milk from non-inspected dairies is brought for sale into other areas where some kind of regulations are in force, causing dissatisfaction to producers within the inspected area and largely discounting the value of such inspection. Much of this is due to the very inadequate powers which hitherto have been at the disposal of Local Authorities, a disability which will be to some extent removed by the provisions of the Milk (Consolidation) Act which is due to commence operations in 1925.

Milk heads the list of our articles of dietary, because:

(*a*) It is a complete food in itself.

(*b*) It is the sole sustenance of infant life both in the human and animal worlds.

(*c*) It is the main and often the only suitable diet in most cases of illness and prostration.

Against these valuable qualities must be set the disquieting facts that:

(*a*) It lends itself to easy adulteration and contamination.

* Presented to the Central Division on April 3rd, 1924.

(*b*) It is a first-class medium for the conveyance into the systems of consumers of pathogenic organisms of varying importance, the most serious of which is the tubercle bacillus.

Although I must refer to it, I am not going to weary you with a long tirade on the importance of a wholesome milk supply and its effect on the public health. That is a question which most concerns the public in general and the medical profession in particular.

As veterinary surgeons, however, apart from its Public Health aspect, a tubercle-free milk has a peculiar interest for us owing to its intimate connection with the spread of tuberculosis amongst our patients, many of the pedigree members of which are safeguarded against infection through the tuberculin test, whilst similar protection of the human infant is usually ignored, or at best receives less consideration than many a well-bred calf.

This is the more remarkable in view of the opinions expressed as long ago as 1907 by the Royal Commission on Tuberculosis that "cow's milk containing bovine tubercle bacilli is clearly the cause of tuberculosis in man, and that a very considerable amount of disease and loss of life, especially among the young, must be attributed to the consumption of cow's milk containing tubercle bacilli."

In 1911, the Royal Commission declared without qualification, after ten years of study and many experiments, that "tuberculosis in cows does cause the same disease in human beings, the infection being transmitted in dairy products."

Drs. Shroeder and Mohler, of the American Department of Agriculture, had earlier come to the same conclusions, and the former declared that "the available figures indicate that more than one-quarter of all the children under five years of age who show symptoms of tuberculosis owe their diseased condition to milk from tuberculous cows, and that more than one-sixth of all children between five and sixteen years of age who suffer from tuberculosis owe their infection to tubercular cows."

In 1908, Dr. Charles J. Hastings, M.O.H. of Toronto, made the following remarkable statement: "If the truth were known, 15,000 children of the 30,000 who die in Canada annually might justly have the epitaph 'poisoned by impure milk' placed on their gravestones."

Now, if only a fraction of these statements is founded on fact, as we have no right to doubt, it is obvious that neither trouble, expense, nor individual hardship should be allowed to stand in the way of a properly-devised effort to free ourselves from the charge of negligence or indifference with which all interested parties stand indicted.

But, here a word of caution; the main thing to bear in mind in advocating methods of milk reform is not to allow the severity of the regulations to interfere with a plentiful output. In other words, we must guard against the possibility of improving the supply out of existence.

This is all the more necessary in view of the low *per capita* consumption of milk in this country.

In many American cities consumption exceeds a pint per head per day. I very much doubt if our people drink a third of this quantity, and this I regard as the most serious matter in the whole milk controversy. It sounds paradoxical to say so, but there are two main things wrong with regard to milk, it is not clean enough, and people, and especially young people, do not drink enough of it.

I can imagine no more pleasurable an occupation for a rich man than to give a couple of milk meals a day to a batch of children whose parents can afford only a pint for the household, and in due time to compare the result with those who have been denied the essential food which nature intended should be theirs.

This brings me to the chief object of my paper, which is to suggest a practical means by which can be obtained a plentiful supply of clean, wholesome milk at a price which makes it a necessity and not a luxury to the poorest among us. First, however, I must briefly refer to past efforts to regularise the milk supply.

The Contagious Diseases (Animals) Act of 1878 gave power to the then Local Government Board (now the Ministry of Health) to make special orders relative to Dairies, Cowsheds and Milkshops, and the order known as "The Dairies, Cowsheds and Milkshops Order of 1885" was made under this Act.

This Order has formed the basis for the administration of duties relating to dairies, etc., up to date, for the operation of the Milk and Dairies Act, 1915, has been postponed by the Milk and Dairies (Amendment) Act, 1922, until September, 1925.

Now all I want to say with reference to any legislation antecedent to the Amendment Act of 1922 or the Act of 1915 (postponed until 1925) is that the powers granted to local authorities were optional and not compulsory, with the result that, in many areas, any benefits which they might have conferred have not been taken advantage of, even up to this day.

Another absurd defect was that local authorities were forbidden to appoint special officers to carry out the provisions of the Act, the inspector of nuisances, if directed by the authority to do so, being the officer specially detailed to carry out the duties in regard to dairies, cowsheds and milkshops. In other words, it was not permitted to appoint a veterinary inspector, *as such*. This difficulty was surmounted in the case of my own area by appointing an "assistant inspector of nuisances," a not very complimentary designation, under which I have acted for twenty-five years.

The Amendment Act of 1922, however, contains some useful statutory powers, capable of being used forthwith, viz.:—

(*a*) The prevention of the sale of tuberculous milk (Sec. 5).

(*b*) Removal of milk retailer from register, or refusal to register a milk seller in certain cases (Sec. 1).

(*c*) Prohibition of colouring matter.

There is just one more legislative effort to which I must allude, viz.: The Milk (Special Designations) Order, 1923. I suppose the provisions and objects of this Order have received due consideration from the persons responsible for them. Apparently, too, the Order is intended to remain a permanent feature of our milk regulations. Personally, I think it will be utterly useless in effecting real improvement in the milk supply of the multitude as distinct from that of the privileged few.

Of the general public, not one person in 10,000 understands what it means, or would take any interest in it if they did. Its provisions, too, are purely optional, a serious defect in milk regulations which should aim at protecting the public against itself.

Another unsatisfactory feature is that the idea can be counterfeited to the undiscriminating eye of the public. As an example, anybody can sell bottled milk, bottled anywhere and anyhow. This is already being done, with the result, no doubt, that consumers consider themselves specially protected, whereas, of course, the exact opposite is the case.

Under this Order, licences can be obtained for the production of no less than five grades of milk. The cleaner the milk, the higher the grade; the higher the grade, the greater the cost; the greater the cost, the more prohibitive the article to those who deserve to be poisoned as little as those to whom a penny a pint is of no consequence.

In point of purity there should be *one* grade of milk, and the only designation required is just that of milk. Raw milk and cooked milk if you like, but without qualification as to how many bacteria you can buy for sixpence.

This reminds me that I had better enumerate the different grades in case they should come up in the discussion, as I never can remember the several formulæ without reference to my pocket book:—

CERTIFIED MILK must not contain more than 30,000 bacteria per c.c. and no coliform bacilli in 1-10 c.c.

GRADE A (tuberculin tested milk) not more than 200,000 bacteria per c.c. and no coliform bacilli in 1-100 c.c.

GRADE A, not more than 200,000 bacteria per c.c. and no coliform bacilli in 1-100 c.c.

GRADE A (Pasteurised), not more than 30,000 bacteria per c.c. and no coliform in 1-10 c.c.

PASTEURISED MILK, not more than 100,000 bacteria per c.c.

It should be noted that, in these bacterial counts, no significance is attached to anything except numbers; the numbers of bacteria which are countable on the plates after cultivation for 48 hours at 37 deg. C. No allowance is or can be made for the largely increased count which might result from household milk being kept at a higher temperature, neither is any distinction made between innocuous or possibly beneficent bacteria and those which may render the milk harmful to persons consuming it in an uncooked state. They are all on the black list together, as it were.

Bacterial counts may be, and no doubt are, useful, but they should only be employed as an adjunct to other and more practical precautionary measures. The average person, in selecting a safe grade, would be justified in choosing one designated by the letter A as being thoroughly wholesome, but he would be living in a fool's paradise in concluding that so high sounding a title meant that the milk was necessarily non-tubercular.

In reading the views of various authorities on the management of our milk supplies, one is impressed with the extraordinary divergence of opinion which exists amongst medical men of equal eminence. One says that all milk ought to be sterilised, *i.e.*, brought to the boiling point for one minute. Another states that it should never be exposed to a temperature exceeding that required for pasteurisation. A third expresses the opinion that pasteurisation shonld be forbidden on the ground that milk so treated causes nutritional disease in children. Another one has fed pasteurised milk to thousands of children, all over the world for years, and has never seen anything except beneficial effects and a much decreased infantile death-rate. Another does not agree with heat treatment of milk because it is useless unless properly performed, as to which you have no guarantee. Somebody else tells us that the structural arrangements of the cow-house have very little to do with the production of clean milk, and one of the most eminent advocates of a pure supply undertakes, with twenty-four hours' notice, to produce Grade A milk in any old cow-house.

All are agreed, however, on one point, which is that where pasteurised milk is fed to children, the rate of infantile mortality is tremendously lessened and the liability to tubercular disease largely reduced.

Now, how does this effect us as guardians of the health of the milk-producing animal? A healthy cow puts into the milk pail a practically sterile fluid. The first precaution, therefore, seems to be to see that your cow is healthy, and this brings me to the part of the business with which we are more intimately concerned, viz., that of

VETERINARY INSPECTION.

As applied to milk inspection the duties of the veterinary surgeon are, or should be, two-fold:—

(*a*) Inspection of the animal, and

(*b*) Of the conditions under which the animal is kept.

As regards both the cow and the cow's surroundings, we will first discuss a few points which would tend to produce ideal conditions, alike unobtainable, of course, in this as in most other things under the management of man.

A clear conception of milk production under ideal conditions is furnished by a study of the Dairy Inspection Report Card of the Public Health Bureau of New York, or the Score Card of the Bureau of Animal Industry of the United States Department of Agriculture, in either of which, compliance with the following conditions would score 100 per cent. marks.

(1) All persons engaged in handling milk, also all persons in their households, must be free from tuberculosis, typhoid and scarlet fever, septic sore throat, diphtheria, dysentery and Infantile paralysis.
(2) Water supply pure and wholesome.
(3) Proper sanitary accommodation for employees.
(4) Ice supply.
(5) Hot water and steam boilers.
(6) Cows tuberculin-tested every six months.
(7) Cows apparently healthy and in good condition (especially udders).
(8) Flanks, udders and teats clean.
(9) Milker's hands washed and kept dry and clean during milking.
(10) Covered milking pails.
(11) Clean milking stools.
(12) Milk poured into pans in clean place.
(13) Milk pails of smooth metal, with flat soldered seams, in good repair and clean.
(14) Milk cans as above.
(15) Strainers (when used) with holders and wire mesh, clean and in good repair.
(16) Fresh cheese cloth or cotton renewable at each milking.
(17) Racks for holding cans after sterilisation.
(18) Capacity and suitability of cooling tanks.
(19) Milk cooled to 50 deg. F.
(20) Proper temperature of water used for cooling.
(21) Sterilisation of utensils by :—
(*a*) Rinsing with cold water.
(*b*) Scrubbing with alkali solution.
(*c*) Sterilising with boiling water or steam.
(*d*) Storage in a clean place.

The requirements with regard to the cow-house are that it should be well drained, free from contaminating surroundings, have a tight, sound floor, with proper gutter, smooth, tight walls and ceilings, and a proper stall tie and manger.

Provision for light calls for four square feet of glass per cow. Ventilation by controllable flue system, and hinged or sliding windows. 500 cubic feet air space per cow. Provision for controlling temperature. The cows to be free from visible dirt. Stable air at milking time free from dust and odours. Cleanliness of every part of house, yard, etc., and removal of manure daily outside a fifty feet radius.

It is not easy to improve upon American suggestions but I should like to say that I consider the usual dung channel or gutter in a cowshed is an abomination. Its chief function seems to be to cause a damming up of the more liquid excreta and urine, with the result that the tail becomes saturated and makes a filthy mess of the udder and quarters.

Neither, in this Utopian cow-house, do I consider a cow should be tied up. Sir Daniel Hall once said that we cannot prevent a cow making dung, or lying in it after she has made it. I admit the former contention, but I question the latter. If you tie her up by the neck for long hours together, she has no choice in the matter, but give her her liberty and she will not knowingly choose a wet or dirty bed.

Dairy cows should not be housed except during the winter nights or very inclement weather, and then a covered yard, well bedded and only partially enclosed, affords the most suitable accommodation.

I am not one of those who believes that wholesome milk can be produced without any regard to the structural as well as the sanitary condition of the cowshed. Most of these seem to have been erected in the dark ages when it was considered the height of folly ever to allow sunlight to enter the place. This defect can be remedied, of course, but many of the structural arrangements are on a par with the absence of light. The shed, as often as not, opens on to a manure yard, a concession to decency being the intervention of a path. Everyone of these sheds is automatically condemned if one insists on the regulation that no manure shall be kept within 30 feet of any window or door.

Space forbids further allusion to the inadequate or unsatisfactory features, structural, and sanitary, of many cow-houses.

If the place is condemned, or important alterations demanded, the occupier ceases to produce public milk and substitutes some other branch of dairy farming. The result is that output is reduced, the very thing we wish to guard against.

Just one other point. The simplest cause of unclean milk seems to have escaped the notice of most people. It is due to the time-honoured custom of rushing the milk to the distributor with all possible speed. If we picture to ourselves an isolated dairy farm, five miles from a railway station, at 5 o'clock on a winter's morning, we shall appreciate at once that this is neither the time or place to worry much about "bacterial counts," the great thing is to catch the train or motor lorry as the case may be, with the result that, to put it mildly, strict attention to clean methods is not conspicuous. And why all this haste? Why do the milk churns go clattering by before many of us are out of bed, and regardless of ought else except "getting there?" Why will not last evening's or yesterday morning's milk do for to-day's breakfast? The answer is, of course, because it won't keep! It "won't keep" partly because it is bacterially dirty, depending upon the care exercised, and partly because it is not efficiently cooled, as to which latter the producer is often helpless.

I have now arrived at the point where I have attempted to show that market milk, *as it leaves the producer*, may be of two qualities, or grades, if you prefer it.

The first grade we can get by inducement, the second one we shall have whether we like it or not. The former would be what is at present known as "Certified Milk," and of higher quality than the latter, which, however, would be at least its equal in point of purity and bacterial innocence.

How I suggest this should be managed, I shall say presently. In the meantime, I want to again refer to veterinary inspection. With regard to what we call Certified Milk, this is all plain sailing, inasmuch as the animals will all be tuberculin tested and the

milk produced under a properly thought-out plan of safety.

The other milk, as concerns the conditions of production, is in a different category. The question is, apart from its standard of cleanliness, Can we, by veterinary inspection alone, guarantee that it will be reasonably danger-proof? I do not think we can, chiefly because I do not believe tubercular mastitis is an easily diagnosed condition. Even if we could detect every infected udder, there is still the danger of tubercular contamination through the dust and dirt of a shed which houses tubercular residents and in which the sanitary conditions are those to which I have referred.

As I view the position, therefore, additional precautions must be exercised at the distributor's end.

I now come to the question I asked at the commencement, "Would Municipalisation of the supply, solve the problem?"

If your answer is in the negative, I hope some of you will show us how it can be solved in any other way.

At the 1922 Milk Conference only two speakers referred to Municipalisation. Both condemned it, but only one gave any reason, which was that "it certainly would never pay." It would be just as logical to say that the policeman on point duty at a busy crossing does not earn his wages.

It seems rather mercenary to talk of a public work "not paying" when the only object of such work is to save a few thousand lives and much suffering. But I do not adimt that "it would not pay." The retailer always receives as much for selling the milk as the farmer gets for producing it, so that the municipality can spend 100 per cent. on the cost before either they or the public are any the worse off.

In my opinion, the municipalisation of milk would have some disadvantages and no dangers. The present system has some advantages and many dangers.

I will now sketch the plan by which I think our milk could be rendered purer and safer if managed "by the people, for the people," and in doing so I wish to disclaim any sympathy with the doctrine of "State ownership" as generally understood:—

(1) All milk producers should be licenced annually, the licencing authority being appointed by the local city, urban or rural councils.

(2) The premises should be registered, a registration board being affixed to the building, with the number of cows for which suitable accommodation was provided.

(3) The whole milk supply of a given area (whether consumed in that area or elsewhere) would be bought, controlled, and managed by what we may term a "Milk Board" appointed by the city, urban, or rural authority.

(4) A central authority, appointed by the Ministry of Health would organise and co-ordinate all supplies, the destination of which was outside the producing area.

(5) The contract price for market milk would be made by a central authority by mutual agreement with representatives of the industry. This price, as far as possible, would be applicable to the whole country and would cover the succeeding twelve months without distinction as to summer and winter prices.

(6) Licences for the production of Certified Milk would be granted by the Milk Board, but in accordance with the regulations of the Ministry of Health.

(7) Inducements to apply for these licences, would be the payment of a higher price for the milk than for that produced under less satisfactory conditions.

(8) Licences for Certified Milk would not be refused however much the supply exceeded the demand (on that ground alone).

(9) The Tuberculosis Order would be re-introduced to put an end to all tuberculin reactors, or cases of open tuberculosis.

(10) Dairies producing non-certified milk would be under periodical veterinary inspection. The premises would conform to a reasonable standard of structural and sanitary requirements.

(11) The sale of milk from cows with any clinical form of tuberculosis, inflammatory condition of the udder, obvious ill-health, or important septic condition would be prohibited.

(12) Collection of supplies would be made by motor lorry in standard churns, collection being facilitated by the more remote farms bringing their supplies to a group centre.

(13) The churns would be taken to one or other of the Board's creameries with which each city, town, or important village would be provided.

(14) These municipal creameries would be equipped with the most up-to-date type of dairy machinery, including pasteurisers, bottling plant, and steam sterilisers. In some, also, would be installed plant for manufacturing cheese, butter, ice cream, and dried and condensed milk.

(15) Facilities for bacteriological and chemical analysis would be provided.

(16) On arrival at the creamery, the certified milk would be cooled, bottled, sealed, labelled and delivered.

(17) The non-certified milk would be dealt with in the same way *after pasteurisation.*

(18) Milk churns, etc., would be sterilised at the creamery before being returned to the farm, and locked, both coming and going.

(19) The approximate local demand for certified milk having been ascertained in advance, any surplus would either be despatched to other localities in efficiently cooled vans, converted into one or other of the milk foods, *or issued gratis to necessitous Board School children whilst actually at School.*

The above suggestions are sufficient to outline the principle at which I am aiming, and I will now discuss

some of their objects before concluding with the subject of pasteurisation.

(1) An annual licence is suggested in order that the risk of non-renewal may act as a deterrent torepeated or flagrant breaches of the regulations.

(2) Visible evidence of the registration of a particular building is intended to prevent the number of cows kept being in excess of the accommodation available.

(3 and 4) The duties of the Milk Boards and Central Milk Authority are obvious and in some respects similar to those at present carried out by the large milk combines.

(5) Fixing prices for a year ahead would be a great stimulus to dairy farming and would help us to be independent of the foreign dairy farmer, to whom we at present pay £56,000,000 per annum.

(6) The model regulations of the Ministry of Health would ensure uniformity, without the disadvantages of centralisation.

(7) The increased price for Certified Milk would be based on the higher cost of production, due to the disposal of tuberculin reactors, and the maintenance of higher sanitary standards.

(8) The greater the number of producers of Certified Milk, the nearer the day when we can dispense with pasteurisation.

(9) This Order, or some modification of it, appears to be the only means by which known cases of tuberculosis can be exterminated.

(10 and 11) The chief reasons are mentioned under pasteurisation.

(12, 13 and 14) These suggestions fulfil the important principle by which supplies can be safeguarded from the cow to the consumer. Also, they provide for the conversion of surplus supplies into human food instead of the present wasteful system.

(15) Great economy in delivery would be effected by eliminating existing competition.

(16) Milk of the same standard of purity would be available for all classes of the community.

(17) The locking of the milk churn, whether full or empty is a necessary precaution of the most elementary kind.

Pasteurisation.

By pasteurisation is meant the process by which milk, either in bulk or bottle, is raised to a specified temperature, retained at that temperature for a specified period, and then rapidly cooled. The difference between sterilisation and pasteurisation depends on the temperature employed.

In the former, a high degree of heat for a short period is employed, in the latter, a moderate heat and a longer exposure.

Sterilisation aims at the complete destruction of all bacteria in milk, and disregards other changes consequent on the high temperature employed.

Pasteurisation seeks to destroy all pathogenic organisms and to sensibly reduce the number of other bacteria without, as far as possible, altering the appearance, taste, digestibility, or nutritive properties of the raw article.

The objects of all processes by which milk is heat treated are two-fold.

(*a*) To increase its keeping properties.

(*b*) To make it safe for the consumer.

There are two main methods, with many modifications, by which sterilisation or pasteurisation may be employed, viz: The flash system and the holding process.

In the former, the milk is heated rapidly to the desired temperature, maintained at that temperature for a very short period, and then rapidly cooled. The holding process consists in raising the milk to a moderate temperature (145 deg. to 150 deg. F.), holding it at that temperature for 30 minutes and then cooling rapidly to 50 deg. or 55 deg. F.

As all authorities are agreed that a temperature exceeding 150 deg. F. has a deleterious effect on the taste, digestibility and nutritive qualities of the milk, the holding process has come to be recognised as the method by which the most satisfactory results can be obtained.

I have no personal experience of the practical application of pasteurisation methods, neither have I much knowledge of the various systems and appliances by which the work is carried out.

It is for the experts to devise the best method if we can return an affirmative answer to the following question: "Is it possible by heat (or other) treatment of bulk milk to increase its keeping qualities and render it safe for the consumer, without substantially changing its appearance, taste, digestibility or nutritive qualities?"

If, as I submit, an affirmative answer must be given, it only remains to decide the means by which the process can be applied to all public milk, except that produced under conditions (Certified Milk) in which the process might be superfluous.

We may first, however, consider what are the popular objections to pasteurised milk. The more important, I believe, are as follows:—

(*a*) The knowledge that his milk will be pasteurised, tends to cause a producer to view with indifference the sanitary conditions of his byres, udder affections, etc.

(*b*) Pasteurisation is worse than useless if not efficiently carried out.

(*c*) One or more of the essential vitamin constituents are damaged or destroyed.

With regard to (*a*), this difficulty would be met by annual registration and periodical inspection, assisted perhaps, by bacterial counts at the creamery.

Dirty milk does not pasteurise satisfactorily and negligent dairymen would soon be mad aware of the fact.

With regard to (*b*), this is a very sound and important objection, and might, I think, be described as the crux of the question.

If a multitude of firms in every town was authorised to supply electric current or public water, both services would be chaotic. So long as anybody may be allowed to sell pasteurised milk of his own pasteurisation, the result will be quite as unsatisfactory and much more dangerous. The desired results can only be obtained by standard machinery of approved type, standard methods, intelligent supervision by trained operators, and uniform methods of handling and distribution common to the whole country. If this be so, can the requirements be obtained in any other way than by municipalisation?

In preparing these notes I wrote to Mr. Hugh Begg F.R.C.V.S., asking what objections, if any, he had to the pasteurisation of market milk on a wholesale scale. His reply was so closely in accordance with my own line of thought, that I am moved to give the following extract from it:—"Commercially, *one of its greatest weaknesses is the variations in the methods adopted*, and although the holding process is stated by responsible people to be ideal in every respect *when properly conducted, the difficulty is to have it so conducted.*" (The italics are mine.) It would seem that most people are agreed that if milk can be held for half an hour at 145 deg. F., organisms we fear most are destroyed, and the cream line, instead of being reduced is rather increased by the lessened viscosity of the milk; that it is only when the temperature is raised to 148 deg. F. and over, that a degree of coagulation of albumen occurs which inhibits the rise of milk fat to form the cream line."

In other words we have at hand a system by which milk can be made safe, if only we make certain that the system be "properly conducted."

With regard to (*c*). The effect of heat on the vitamin constituents. Of the three essential vitamins contained in milk, the balance of opinion seems to be that vitamins A and B are not appreciably affected by pasteurisation, "if properly conducted." Vitamin C (the anti scorbutic factor), however, appears to be more vulnerable, although opinions are divided as to its power of heat resistance.

All are agreed, however, that even if completely destroyed, an occasional dose of fruit juice provides a very efficient substitute. The chief danger of losing the whole of this vitamin appears to be in *repeated* pasteurisation, which is another reason for placing the work in the hands of disinterested persons.

A medical friend, in charge of a large Infant Welfare Centre, informs me that any harmful effects on the health of a child, due to reduction of vitamin C would be very gradual, and easily counteracted by a little fruit juice before any real damage had been done.

Besides pasteurisation, treatment of milk by electricity, ultra violet rays, or ozone possess, at present a merely academical interest.

The suggestions I have laid before you will probably be regarded in the way I have presented them, as chiefly, if at all, practicable in the case of towns and large industrial centres. One cannot enter into every detail in the space at one's disposal, but, apart from the more pressing needs of the town dweller, due to conditions of environment, the scheme could quite well be extended to every village and hamlet.

In regard to the more sparsely populated rural areas, the difficulty of supplying pasteurised milk, could be surmounted by the granting of a subsidy to selected persons for the production of certified milk, supposing it were considered expedient to safeguard the supplies of thsse comparatively small numbers.

In concluding one's remarks on an occasion of this kind it is customary to tender apologies for the inadequacy of one's effort. In so far as I have been able to control the circumstances of its production, I ask your kind indulgence on the many defects of this paper, in the full knowledge that you will not expect me to apologise for having done the best of which I am capable in the very inadequate time which I have found available for its preparation.

References.

Principles and Practice of Milk Hygiene—Klein.
Report of Proceedings of National Milk Conference, 1922 and 1923.
Infant Welfare—Nathan Straus.
The Milk and Dairies (Amendment) Act, 1922, and The Milk (Special Designations) Orders, 1923—A. Gofton.

Discussion.

Lt.-Colonel J. W. Brittlebank, of Manchester, who was received with applause, opened the discussion as follows: I must first thank the President for his kind invitation to me to come here to open the discussion. I do so principally because, in the first instance, to have the opportunity of opening the discussion on a paper prepared by my friend Mr. Spencer is a peculiar pleasure and an opportunity I should not have liked to have missed, for he is always very refreshing; and in the second place because, having been concerned for so many years in trying to improve the milk supply of one of our cities, it is possible that one may have something to suggest in criticism of some of the points that are raised.

For some twenty-three years I have been, as I have already pointed out, dealing with this question of the milk supply. But for the last few years I have been in a somewhat better position to study it, inasmuch as I am now the responsible officer for the city which I serve, controlling the whole of the milk supply. That has given me a very good opportunity of approaching this question from many aspects—and there are many aspects to this question—of which sight should not be lost.

It has been quite common to compare the proposal which has been put before us for discussion to-night with that of the ordinary services with which municipalities are now principally concerned—I refer to water, gas, trams, electric light, etc. To my mind, it is very difficult to compare the distribution of milk with that of these other necessities of civilisation because, after all, the first point that strikes one is that if municipalisation is going to take place, or is to be proposed, then you have not only got to

municipalise the distribution, but you have to municipalise the sources of production. I think if you look at it from that aspect you will realise with what an enormous problem you are being faced.

Also I think what Mr. Spencer means to put before us is the municipalisation of distribution, or public control of distribution. In the earlier portion of his paper, Mr. Spencer has attempted to epitomise a good deal that has taken place in the past twenty or thirty years. Much of what he says is not open to criticism. There is, however, one statement in which he says, "In the smaller towns and rural areas, any attempts to secure supplies of clean, wholesome milk are generally half-hearted and lacking in uniformity." I think Mr. Spencer would have liked to have said, what is true, that they do not exist at all (hear, hear), because, if my experience is reliable, in rural areas, at least those with which I am familiar, there is no effort whatever to deal with the question of control of the sources of production.

Later, Mr. Spencer makes the statement—which I think has probably been made in a hurry—that "As veterinary surgeons, however, apart from its Public Health aspect, a tubercle-free milk has a peculiar interest for us owing to its intimate connection with the spread of tuberculosis amongst our patients, many of the pedigree members of which are safeguarded against infection through the tuberculin test." I think probably what the author meant to say was that their freedom from tuberculosis is ascertained by means of the tuberculin test, because, of course, a paper like this is to be printed and circulated, and the lay public may be lead to imagine that the application of the tuberculin test is a protection against infection.

Mr. SPENCER: I meant that the young animals might be safeguarded.

Colonel BRITTLEBANK: Mr. Spencer goes on to refer more particularly to the history of the Dairies, Cowsheds and Milkshops Order of 1885, made under the Contagious Diseases (Animals) Act of 1878. I am at a loss to understand his position here. He points out "that local authorities were forbidden to appoint special officers to carry out the provisions of the Act, the Inspector of Nuisances, if directed by the authority to do so, being the officer specially detailed to carry out the duties in regard to dairies, cowsheds and milkshops. In other words, it was not permitted to appoint a veterinary inspector, *as such*."

On reference to the Order itself, in Section 13 it is provided that a local authority may from time to time make regulations for the following purposes—for the inspection of cattle, cowsheds and dairies, prescribing the requisite allowances in regard to light, ventilation, etc. Most of the local authorities have taken care to have inserted the position of the veterinary inspector. It may be that I have mistaken what Mr. Spencer really means, but I cannot see where, if such regulations have been made by the local authority, there is any necessity for a veterinary officer to be camouflaged by the title of Assistant Inspector of Nuisances.

Mr. Spencer has brought the position up-to-date. He refers here to the Amendment Act of 1922, and deals with the policy which the Ministry of Health have thought it wise to adopt and that has provided for a number of different grades of milk. I think there can be very little doubt that, in the minds of most of us who have had this difficult subject to study, this is viewed as an extraordinary mistake to make. There can be only two classes of milk, and they are easily defined—one is good and the other is bad. (Applause.) But if we remember that these Orders were drafted, to a very large extent, without consulting anybody who had any experience of dealing with this question, and that the example of America was taken, one can easily understand how it is that these mistakes are made. A reference to the whole question of legislation dealing with this problem, though a digression, may be permissible. Some part of this work is controlled by the Ministry of Health; and the Ministry of Health, in their wisdom, have been only concerned to secure control of the distribution of milk. The Ministry of Agriculture have all along taken principal care to see that the producer has been protected, and the responsibility has been entirely placed upon the shoulders of the distributor. This is a most unfair burden to place upon the distributor, and until there is some recognition that no divided control is ever likely to produce good results in a big national question like this, I fear there is little use in imagining that satisfactory results are to be obtained. I know that, despite all that has been done throughout the many years of work in my own city, the bulk of our milk contains an almost unbelievable quantity of dirt, which chiefly comprises, as we all know, that most offensive form of dirt, cow-dung.

Mr. Spencer draws attention to a most unsatisfactory feature of present legislation and that is, that anybody can sell bottled milk. One is familiar with the up-to-date bottling plants, where sterilisation is carefully carried out and where little, if any, fault can be found but one is also acquainted with the, shall I say, illegitimate competitor, who takes the ordinary milk as it comes from the farm, of no certified value, and puts that into a bottle merely to delude the public—because there is no doubt that that is what is done. We feel very strongly that this aspect of the problem requires the very strongest representation to the Ministry of Health. (Applause.)

Now, in my city, we have taken the fullest possible opportunity presented to us under Section 2 of the Milk and Dairies (Amendment) Act to emphasise certain points, when distributors of milk are registered, to try and overcome this difficulty. But, unfortunately, one has to remember that when a person is registered in such a manner, Section 2 provides that you can have no control whatever as to how such a man sells his milk. He may bottle it or sell it openly.

I should like to ask what is meant by the innocuous or possibly beneficent bacteria which Mr. Spencer suggests may be present in milk? Mr. Spencer goes on to say that bacterial counts may be useful, but

that they should only be employed as an adjunct to other measures. These bacterial counts are, at any rate, very important adjuncts and we find they are on extraordinarily reliable index of what is taking place at the sources of production. We find, upon subsequent inspection of these farms, that there is a very exact relationship between the results that we get from this process and the conditions of production. We have, at times, bacterial counts which are enormous: three to four hundred million bacteria per c.c. in the summer months I have known quite frequently. But there is a considerable amount of milk, I am glad to say, which is of a very high standard, and that brings us to one of the most difficult problems. There are many, many farms at most unsatisfactory places which are capable of producing a very high quality of milk, free from unnecessary dirt and of high keeping value. There are, on the other hand, many beautifully-constructed places from which the milk is consistently very dirty. That shows that there is no controlling the human element which lies behind the whole of this question. I have been very much impressed by this factor—indeed, I have pursued a certain policy to which I should like to refer, and that is, that for many years before these various grades of milk were hatched we have had our hospitals in the city supplied with milk from animals under veterinary inspection, but without the tuberculin test. Results can be obtained in this way, and I hope that, later on, I shall publish them. We receive milk from a number of model farms, but I have also chosen one insanitary farm to supply us, and, despite the absolute absence of all modern equipment on this farm, the milk supplied from it is almost invariably the best. A great testimony to the character of the individual.

These cows are all examined once every month; all freshly-introduced animals are specially examined before they become part of the milk-producing herd, and on no occasion since these cows have been under control has any tuberculous milk been produced on these farms. Twice a month mixed samples are taken from each of these farms and submitted for biological examination. I advise this, because it is a testimony to what veterinary inspection can do without tuberculin, and I think it should not go forth to the world that the Veterinary Profession cannot offer a very reasonable measure of protection to the public so far as the milk supply is concerned and its freedom from tuberculosis is concerned. (Applause.)

I admit all that Mr. Spencer says about the difficulty of diagnosing tubercular mastitis, but under a system such as this, even if you had got tuberculous milk from one of these cows, it is not going to be excessive in quantity and it is not going long without discovery.

Mr. Spencer, I think for reference, has inserted here particulars of the conditions required by both the Dairy Inspection Report Card of the Public Health Bureau of New York, and the Score Card of the Bureau of Animal Industry of the United States Department of Agriculture, to secure 100 per cent. marks. I have attempted to keep score cards for a good many years, and I am rather tempted now to come to the conclusion that if it is intended to put inspection into the hands of unpractical people, that is the only excuse for the score card system. It is extraordinarily difficult to standardise something which does not lend itself to standardisation—and that is the source of production, and you cannot standardise that by this system of marking. I also think that these score cards, followed up, as they are, with a lot of publicity, may be quite a useful medium for advertising milk, but they are not much use in controlling the distribution of milk on farms that experienced men have got to inspect. If you are going to carry it out without any qualification whatever, then you have got an excuse for the score card system.

Mr. Spencer goes on to specify a set of regulations which might be drawn up for the municipalisation of milk. It fell to my lot some three years ago to be required by my Committee to prepare a report upon the municipalisation of the distribution of the milk of the city of Manchester. I approached this task with a good deal of enthusiasm—I thought it was a perfectly simple matter. The chief reason for municipalisation seems to be that the muncipality, being like Cæsar's wife, without reproach morally—(laughter)—will produce something better than those interested in the trade. One of the other reasons is that the merchanting of milk is very expensive, owing to the fact that you get six or seven carts in one street distributing milk. That is perfectly true. But the same thing applies to most of our foodstuffs—meat, vegetables, and so on. We will admit for the moment that the handling of milk is fraught with greater danger, owing to its nature, than most of these other foodstuffs, and that it therefore calls for a special effort to try and secure its delivery in a safe condition. I think Mr. Spencer really means that the whole of the milk distributed throughout the country should be under public control. I wonder whether he realises what this really means? So far as the City of Manchester is concerned, we receive about 40,000 to 45,000 gallons of milk into the city from areas extending to eighty miles outside it. In the first place, the municipality would have to compensate everybody who was interested in its dairy business throughout the country. The city could not take any of these special rights without paying for them, and all these payments would represent the capital invested in this particular business. There is no doubt about it, that so far as a city like mine is concerned, it could be run, and run very profitably. Mr. Spencer says it does not matter whether it is profitable or not—I think that is true, Mr. Spencer.

Mr. SPENCER: No, I do not think so.

Colonel BRITTLEBANK (reading from the paper): "It seems rather mercenary to talk of a public work 'not paying' when the only object of such work is to save a few thousand lives and much suffering. But I do not admit that 'it would not pay.' The retailer always receives as much for selling the milk

as the farmer gets for producing it, so that the municipality can spend 100 per cent. on the cost before either they or the public are any the worse off." Well, if the municipality spends 100 per cent. over and above the cost of production, it obviously will not pay at present-day figures. Probably, from the public health point of view it does not matter if it does not pay, but that is carrying us to extremes; it is a somewhat dangerous doctrine. Because a thing is beneficial to health there is no reason why it should not be economically worked.

After this compensation, you have to set up a fresh addition to the already numerous people who comprise the public officials of this country. Is it a common thing to find public officials, or officers serving municipalities, cheaper to employ than those employed in private labour? I think they are not. There is also the feature that, at any rate in the lower grades of public work, there are many avenues into which many inefficients are pushed.

The municipality, then, would be in the position of having secured the control of the whole of the distribution of the milk. They would then have to scrap 90 per cent. of the existing facilities and to create new ones. They would have to build collecting centres, and they would have to make themselves responsible for the carrying of much of the milk into the city, all of which undertakings represent a very large amount of capital.

I do not want to express any particular opinion either in favour of or against municipalisation, but there is one thing that would happen, and that is that the municipality would inevitably buy in a very difficult market. The producer would expect more than he expects to-day from the milk dealer, and it has to be remembered that it is only when you have a great excess of production that you are able to buy in anything like a satisfactory manner, because there must be one fundamental requirement at the back of it all, and that is, that even if you are going to distribute milk to the municipality, you must do so at a price that is within the reach of the poorest of the population.

I should like at this point to refer to the reply to Mr. Hugh Begg. Mr. Spencer wrote to Mr. Begg apparently asking what objections, if any, he had to the Pasteurisation of market milk on a wholesale scale, and Mr. Begg replied, "Commercially, one of its greatest weaknesses is the variations in the methods adopted, and although the holding process is stated by responsible people to be ideal in every respect when properly conducted, the difficulty is to have it so conducted." "In other words," says Mr. Spencer, "we have at hand a system by which milk can be made safe, if only we make certain that the system be properly conducted." I have read this to refer more particularly to the implication here that the majority of the people interested in the distribution of milk are not honest, and that the municipality would be more honest, or more thorough. It is not my experience. I know it is very common to condemn either farmers or milk dealers and say that the whole lot of them, as a class, are dishonest. I challenge that. I have been more and more impressed, as I grow older, with the extraordinary desire to play the game which is displayed by the bulk of the traders with whom I come in contact. (Hear, hear.)

Will a municipally-controlled undertaking do anything to undertake the control of tuberculosis in dairy cattle? I say no, because they are out to get the consumer a safe article at the lowest possible cost. That brings me to the question as to how this is most easily to be achieved. I have, although I am a veterinary surgeon, advanced on a policy of wholesale Pasteurisation in my city. For twenty-three years I have been interested in trying to get the sources of production free from disease. Something like 9 to 10 per cent. of the milk that came into the City of Manchester last year was tuberculous when we examined it. This question of tuberculous milk must, I think, be dealt with in two separate sections. As public health officers, it is our duty to take the shortest cut to safety for the consumer, and the shortest cut is reached by low temperature Pasteurisation. Low temperature Pasteurisation does furnish the requirements specified by Mr. Spencer. It produces a safe milk; a milk without any objectionable taste; a milk which gives a good cream line, and a milk of a low bacterial content. But to get a low temperature Pasteurisation, you must have a reasonably clean milk to start with. The dairy companies have to provide a centrifugalisation cleaning process, which is done by the merchant under licence. The cost of Pasteurisation works out at 2d. a gallon. I know it has been suggested that these people will not carry out their job. It is true that you will always find the backslider, but we have a very good safeguard in information that comes from the trade itself. We have got so far that we can produce milk complying with all the conditions of the Milk (Special Designations) Order without any cost to the municipality. So far as the consumer is concerned, I venture to say that, having accomplished that, you have done what you set out to do, and it is only a question of time before you complete the whole circle.

But alongside this effort there is another policy, because all this treatment of milk is primarily necessitated by the dirt which it contains from the sources of production. One looks to the time when one can get rid of some of these charges. Alongside this policy we have the policy of producing a safe milk under veterinary inspection, and the demand is growing steadily. But I do not think that the time has come when the wholesale testing of cattle is a practical solution of our difficulties.

It is, I believe, accepted that the profession wants the Tuberculosis Order, and I think Mr. Spencer will agree with that. So far as we are concerned, I am not certain that the Tuberculosis Order will effect what many people think it is going to effect, and I would like to suggest to Mr. Spencer that to these conditions which he has drawn up here he should have added that there shall be a compulsory disin-

fection every six months of all buildings in which cattle are kept for milk production. If we can materially reduce the percentage of tuberculosis on these farms, some useful contribution to the subject will have been made.

I do not think municipalisation will help. There has been an extraordinary diversity of opinion throughout the last twenty-five years, and as a rule the people who have been most energetic in their expressions of opinion as to what ought to be done, have been the people who know least about it. The Veterinary Profession has, so far, said very little. Municipalisation, if it were possible to carry it to a legitimate conclusion, and nationalise the sources of supply, might deal with the problem, but it would be an enormous incubus upon the population of this country. (Applause.)

Mr. E. C. WINTER thought that, for the reasons stated by Colonel Brittlebank, municipalisation would be a failure. He was familiar with the system of State control in California, which was very superior to any system of municipalisation No one could supply milk except under licence; his cattle had to be regularly inspected by a State official once a month—and all dairies were inspected on the surprise visit system.

The milk was not Pasteurised, but its source of production was made as clean and sanitary as it was possible to be. No man was allowed to sell milk unless he had at least five cows, so as to make it worth while to carry out the inspections. If the source of supply was right, they had the root of the whole matter right. Municipalisation would fail, because its costs would make the cost of milk prohibitive. In the State of California all milk sold had to be bottled at the source.

Professor MACQUEEN: How is it collected in the first instance—by machinery?

Mr. WINTER replied that in the bigger parts it was collected by that means and in the smaller parts by hand. As regards its cost, the people paid 5 cents (about 1½d.) for half a pint.

Mr. COLEMAN thanked Mr. Spencer for his paper and Colonel Brittlebank for his opening of the discussion. He supported Mr. Spencer in his statement that that matter was not considered sufficiently by veterinary societies, and it was his view that their failure to take due interest in that and kindred subjects was one reason why they did not get many appointments which should be theirs.

He would like to ask Colonel Brittlebank if he meant it when he said that the bacteriological counts were greater in the summer.

Colonel BRITTLEBANK: They invariably are.

Mr. COLEMAN said he had found them more numerous in winter when the cows were milked inside. He appealed to his brother practitioners to visit farms some distance from London unexpectedly in order that they might acquire knowledge as to the actual state of affairs at the source of supply before the farmer had time to rectify matters. Farmers told him that they had no encouragement to produce clean milk. With regard to Grade A (Certified) Milk, they said that there was no market for it. Colonel Brittlebank had said that Pasteurisation costs 2d. a gallon. If the farmers could get that, then it would encourage them to produce clean milk. (Hear, hear.) Was it not much better to produce clean milk than to clean it afterwards by Pasteurisation? Moreover, were there not objectionable constituents in dirty milk which were not affected by Pasteurisation and which would cause digestive disturbances, if nothing worse, in the human being who consumed them?

He would like to see greater uniformity in the Acts which were passed dealing with the question of milk. Vested interests were largely represented, and they were not going to allow any Act to come into force which would interfere with them. The distributors were largely to blame, for they deceived the public by telling them that the milk they received for sale was always clean and perfectly good.

Professor WOOLDRIDGE congratulated Mr. Spencer on his first appearance at a meeting of the Central Veterinary Society, and also on the excellent paper which he had prepared for their consideration. He had made out, in the first instance, a very good case for the control of the milk supply in some way or another, but he was not sure that he had made out an equally good case for the municipalisation of it. Mr. Spencer's proposal was an Utopian one, but he (Professor Wooldridge) agreed with him that some drastic control was highly desirable and was a practical proposition.

Colonel Brittlebank had shown them how it had been carried out in one of the large cities by insisting on the distributors Pasteurising their milk. But it seemed to him that a system of State or municipal control in that respect would be very much better. He (Professor Wooldridge) suggested the establishment of what might be called a "clearing house" for milk in each Municipality, through which all milk for the district should pass. Bacteriological examinations should be made at frequent intervals, and all milks containing pathogenic organisms or bacterial counts exceeding those now required for Grade A milk should be pasteurised and the relatively small cost divided between the producer and distributor, This method would reduce the cost considerably by doing away with the multiplicity of plants.

As to the bacterial counts, he agreed with Mr. Spencer when he pointed out that ignoring the character of the organisms was a mistake. He thought that the two things should be taken together. Bacterial counts of all organisms of all types gave a pretty good indication of the conditions under which the milk was produced and distributed, but the nature of the organisms could not be ignored.

In the course of his paper, Mr. Spencer had objected to the gutters behind the cows, and wished to do away with them, but he had seen a system in Holland which overcame the objections mentioned. There they had gutters two feet deep behind the standing, and on making enquiries as to whether it would not be dangerous, he was informed that they had never

had a single instance of any mishap. The effect was to remove the hind quarters of the animals from proximity to the bulk of the fæces. Another peculiar feature was adopted in the stalling of their cows, and at first sight it made one smile, but one soon saw the reason for it. Behind every stall, suspended from the ceiling, was a long cord which they tied to the loose ends of the tail, so that when the cow lay down the end of her tail was prevented from coming into contact with the floor and did not interfere with the swishing of the tail when standing. They assured him that it was a sound, practical proposition.

The bottling of milk, if carried out under proper conditions, was certainly a sound procedure, but he was afraid it was often eye-wash. (Hear, hear.) Milk was not infrequently bottled in the street (he had seen it more than once), and the milk boy, plunging a none too clean hand into a grimy pocket, would draw forth a disc and insert it. He would like to support any suggestion with regard to annual licences. He thought they would help very materially to maintain a pure milk supply, and that these licences should include both the producer and the distributor. He would like to have some information in regard to the holding process of Pasteurisation. He believed that process was to keep the milk at from 145 to 150 deg. F. for half an hour. He wanted to know whether or not conclusive experiments had been carried out as to the effect of that short exposure upon tubercle bacilli; 60 to 63 deg. C. for half an hour was a very short period.

In those instances where there is no effective control of the method of production, he thought all milk should be Pasteurised. No milk was brought into his house which was not Pasteurised before it was consumed; he would not take the risk. It would make for economy if the Pasteurisation could be conducted at one or two large centres.

Professor MacQueen thanked Mr. Spencer for the excellent quality of his contribution. The subject dealt with was a very controversial one, and they should distinguish clearly between milk production and milk distribution. They might be able, by Mr. Spencer's system, or some other, to control distribution, but he was afraid they were a long way off the period when they would be able to control production. What was the exact position of the veterinary surgeon in connection with the production of milk? Most attention seemed to have been centred upon the discovery of tuberculosis. He thought that the veterinary surgeon, if he was carrying out his duty as an inspector, could not really confine himself entirely to the diseases met with in the milk-producing animal. If the veterinary surgeon was engaged in looking after the production of clean milk, he must see not only to the health of the cow, but he must see to the feeding of the cow. Did not the feeding of milch cows affect the quality and the flavour of the milk?

There was no possibility, so far as he could see, of obtaining what was called absolutely clean milk so long as the human element was an indispensable factor in its production. Let them think of the peculiarity of the occupation of supplying milk from dairy farms. The milker, starting work from half-past three to half-past six in the morning, was not going to be very particular, and in these days of great push there was no time for the scrupulous details which good hygiene would indicate.

He believed that a kind of municipalisation of distribution could be managed and thought the suggestion of Professor Wooldridge, that the whole of the milk should be Pasteurised at one or more centres, would materially reduce the cost. Professor MacQueen concluded with the entertaining suggestion that, to ensure hygienic milk distribution, the cow itself should be conveyed from door to door on a motor van and milked into the sterilised container of the consumer.

Mr. Kirk: Being essentially a town worker, I cannot claim any special knowledge of milk production, and therefore will not presume to criticise Mr. Spencer's paper, except to say that I consider it a splendid and well-thought-out effort. As a Fellow of this Society, it is a pity that Mr. Spencer appears here to-night for the *first* time, as I believe if he could attend more often, he would add considerable value to our deliberations. (Applause.)

In reading through his paper, I was particularly struck by the statement on page 6, that a veterinary public health official must occupy a position subordinate to that of an Inspector of Nuisances. If that is a fact, it is an inquitous state of affairs and an indignity upon our profession. I would like to ask whether nothing can be done to reverse the positions of the two officers.

I have only one other point to add. Papers like that we have just discussed, urging reform in matters relating to public health, are, of course, very laudable and useful. But as delivered to a body of veterinary surgeons, they become like the many admirable articles in the *Record*, which also are read only by veterinary surgeons. We, as a profession, require no conversion. It is the public who must be converted, and I strongly advocate the sending of Mr. Spencer's paper to the lay press, or a section of it, that we may endeavour to enlist their sympathies with our views, and if possible, induce them to commence a campaign which might conceivably force the hands of the Ministry of Health, to give the veterinary officer wider duties, greater powers, and an improved recognition and status.

I wish, in conclusion, heartily to thank both Mr. Spencer and Colonel Brittlebank, for travelling so far south, to give us the benefit of their especial knowledge, and for providing us with such valuable material for discussion. (Applause.)

The Reply.

Mr. Trevor Spencer: First I should like to thank you very much indeed for the very kind reception you have given to my paper and for your assurances that it has stimulated your interest. I am glad to know that I have been successful in this and that we have had a very profitable discussion.

My chief object in bringing this subject before you was to try to show to you and, through you to the profession, that we should be a little less modest in the way that we approach these public health questions, and that we should do something to push ourselves into the arena where these matters are discussed. In support of the contention that we have allowed ourselves to be ousted in this matter I would bring to your notice the following :—

"The Minister of Health and the Minister of Agriculture and Fisheries have appointed a joint Committee to advise their Departments on matters concerning the production, handling and distribution of milk and dairy produce, including questions relating to education and research, and any legislation, orders and regulations which may be under consideration.

"The Committee consists of Lord Kenyon (Chairman), Mr. T. Baxter, Mr. W. Buckley, Mr. T. J. Goodchild, Mr. J. J. Kearns, Mr. E. W. Langford, Mr. J. H. Maggs, Mr. A. Park, Mr. T. J. Roper and Mr. J. L. Shirley.'

There is not a single veterinary surgeon upon it. The veterinary surgeon,by reason of his daily work, sees more of the production of milk, both officially and in his unofficial capacity, than any other class of the community, and it is strange that, whenever regulations are drawn up to attempt to obtain what we all want to see, the Veterinary Profession is always left in the background. I agree with Mr. Kirk that something could be done by a Publicity Committee in order that our claims to recognition should gain greater attention from the authorities. It strikes me very forcibly that we shall have to find new fields for work if we are to prosper, or even to continue to exist. To refer to Colonel Brittlebank's opening of the discussion, he refers to the remarks I made on the efforts put forward by the smaller towns and rural areas. Such attempts as are made are usually very feeble. Colonel Brittlebank takes exception to the statement that many pedigree animals are safeguarded against infection through the tuberculin test. What I intended to imply was, that by testing the dam, the offspring of the dam is often safeguarded in a way that is not often done with regard to the human.

With reference to the point raised that the local authorities were forbidden to appoint special officers to carry out the provisions of the Act, Colonel Brittlebank says that is not correct. Although it is not strictly correct to say that they were forbidden to appoint special officers, the Order of the then Local Government Board said that that body might appoint them if asked by the local authority to do so. The result was that nobody took any notice of the regulations. It is absolutely true that the veterinary inspector cannot be appointed as such, but the Act of 1915 states that it is compulsory that a veterinary inspector shall be appointed. Colonel Brittlebank asked me what I meant by referring to the beneficent bacteria in milk. I do not know, and I do not think Colonel Brittlebank knows, just what they are. I should not like to specify them, but neither should I like to deny that such bacteria exist. The chief objection that I have to bacterial counts is that they do not tell you where the bacteria came from. I agree thoroughly with Colonel Brittlebank's remark that it is impossible to control the human element in the matter of milk production. There are a lot of people producing milk who have no idea of ordinary cleanliness in their own homes, much less in a cowshed, and that is a difficulty I try to get over by advocating the Pasteurisation of milk which you cannot get clean in any other way. I agree that a large measure of security can be obtained by the tuberculin test, but I do not agree that the measure of security is sufficient for the purpose. We are usually told that we need have no fear of a tuberculous cow giving tuberculous milk so long as her udder is non-tuberculous. By that I suppose is meant so long as her udder shows no clinical evidence of tuberculosis. The difficulty is that a cow may yield tuberculous milk before clinical evidence of tuberculosis is visible. Neither do I agree that we may safely regard a tuberculous cow, having a normal udder, as a safe creature so far as milk is concerned. I believe it is quite possible, not only for a tuberculous cow, but for a perfectly healthy cow to give off tubercle bacilli in her dung. Thirty or forty per cent. of all residents in our cowsheds are tuberculous; the mangers of these cowsheds are contaminated with tubercle bacilli, and it seems to me that the healthy cows in these stalls may ingest tubercle bacilli and void them in their fæces, and that tubercle bacilli may gain access to the milk in that way. Therefore, I think that the only thing to do is to exercise some precautions at the other end. Colonel Brittlebank knows the milk is tuberculous and he has taken the only sensible precaution, viz., to kill the tubercle bacilli by Pasteurisation, at least of a portion of the supply. Why should Manchester be specially favoured? I maintain that it is only by making the practice common to the whole country that you will make the milk supply safe.

Colonel Brittlebank refers to the score cards, and he gave the impression that I approve of them. I do not at all, because when I mentioned them I refer to what I called Utopian milk. He asks if I realise what it means to municipalise the milk supply—Manchester gets rid of 45,000 gallons of milk per day. Well, it is being done to-day—it is being dealt with in Manchester by perhaps fifty firms. They have fifty plants for Pasteurisation where they need not, perhaps, have more than five or six. Colonel Brittlebank thinks that the compensation would be an awful business. That is not a very serious matter. Distribution charges at 1s. a gallon come to £2,250 *per diem*. If you have so much money to play with I do not think you are doing a bad piece of business. You can spend 100 per cent. on what you give for the milk and then sell it at the same price as you sell it to-day. As for the costs of collecting, somebody is collecting it to-day, and as for the surplus, there is no surplus so long as we are paying millions a year for foreign

(Continued at foot of next page.)

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WEMBLEY EXHIBITION.

The opening of the British Empire Exhibition by His Majesty the King on St. George's Day may not cause undue excitement to the average member of the Royal College of Veterinary Surgeons. But the opening of this exhibition, the largest of its kind that has ever been attempted, showing the vastness, wealth, and strength of the British Empire, must surely make a great appeal to the average country practitioner who has by compulsion to spend his time and practically his life in journeys on the roads within a radius of ten miles or so of the country, village, or town in which he resides. This hard-worked individual has little time on his hands to spend in reading much else than his professional journals, including, we hope, *The Veterinary Record*, and in making occasional references to text books to try and help unfathom those "curious cases" which from time to time confront even the cleverest practitioner. It is more than probable that there will be no veterinary section attached to the exhibits; but a visit to this wonderful portrayal of our colonies and dependencies cannot but be of great interest to an M.R.C.V.S.

It is certain that information will be gained as to the nature of the livestock, agriculture, and other matters of vital interest to us as a profession prevailing in the vast countries which we Britishers are proud to speak of as our colonies. The ravages of or the prevalence of diseases among animals will probably not be among the foremost of the exhibits; but doubtless much as to the nature of this may be gleaned from those in attendance. It would seem to us, therefore, that those newly-qualified, or about to qualify, and who have misgivings as to a future in the homeland, should visit Wembley and try and satisfy themselves as to the prospects of colonial life before coming to any decision, and then obtain detailed information from the Appointments Committee of the "National."

Busy country practitioners with old-established practices should make it part and parcel of their business to visit this unique exhibition, and thus increase their knowledge and help broaden their views on life in general. We are, of course, a comparatively small unit (although an important one) in the things that matter in the universe, and it would have been hopeless to try and establish ourselves as an "exhibit," but it would seem that something in the way of a chance for propaganda has been lost—let us hope only for the time being.

Might this exhibition not have been used for calling together a Colonial Veterinary Conference, where such things as salaries of veterinary officials, cost of living, the recognition of colonial diplomas, and many other such matters could have been freely discussed instead of being dealt with by more or less stilted correspondence? A reception to the delegates by the Royal College would go far to cement the bond of friendship and good feeling already existing with our colonial confrères. So, too, exhibits showing the work performed by the veterinary staffs in the different colonies might have been included in the Agricultural Sections, if no more prominent space could have been found for them. Should the exhibition run for another year, perhaps some public-spirited member will come forward with the offer of his services to organise something as roughly indicated above in 1925.

(*Continued from previous page.*)

supplies—the thing is that we do not understand how to handle it. (Hear, hear.) Colonel Brittlebank objects to one point I raised in connection with Pasteurisation on the ground that he thinks most people in the milk trade are honest. I have no doubt they are. It is not a question of honesty; it is a question of the type of Pasteuriser that they use, and how they use it when they have got a good one. I hope Professor Wooldridge himself Pasteurises the milk that he uses in his own household. (Laughter.)

Colonel Brittlebank finished up by saying that municipalisation would not solve the problem. That brings me to the point that the suggestion of circulating the papers (made earlier in the evening) will not do any good, because it shows me that most of the people here, even, have not read the paper properly. (Laughter.) Would some of you tell me how the problem is to be solved in any other way? I have not heard a single suggestion of any other way—Professor MacQueen's excepted. (Laughter and applause.)

Herefordshire Diseases of Animals Committee suggests to the Ministry that the regulations which apply to stock in connection with foot-and-mouth disease should apply also to poultry. This would not only restrict the movement of poultry to markets and shows, but would prevent geese and turkeys from abroad coming into the country for feeding purposes.

The Humanity of Methods of Slaughter.

By R. G. Linton, M.R.C.V.S., Department of Hygiene, Royal (Dick) Veterinary College, Edinburgh.

(Continued.)

Supposed Danger of a Free Bullet Instrument.

It is satisfactory to note that Professor Hill prefers a pistol to the pole-axe, but it is regrettable that he should say, not as an expression of opinion, but apparently as a statement of fact, that the free bullet instrument is unsafe in slaughterhouses. One can only conclude that Professor Hill is not conversant with the real facts concerning the general use of instruments firing a free bullet and how these can be used without any accident at all if used properly and by proper persons.

What evidence is there to support the statement that "humane killers" firing a free bullet are dangerous? The most complete list of accidents is that published by the National Federation of Meat Traders' Association (Inc.), and distributed by them with the hope that it will give support to their opposition to the use of these instruments.

This list covers the period from March 19th, 1913, to April, 1923, and during this period of ten years many thousands of animals have been killed by instruments firing a free bullet. In this list there are records of twenty-three "accidents," of which thirteen had fatal results. Of these thirteen five on enquiry were returned as "suicides," and three "found shot," and of these three, in at least two cases a bullet was found in the head of the man. No further information concerning these three cases is given in the list, so that one may ask, Was it by an accident inseparable from the proper use of the instrument that the bullet entered the head of each of these men? An impartial enquirer into the safety of these mechanical killers will naturally ask if the five suicides are to be regarded as "accidents," and to be used as evidence that the instruments are so dangerous that they should not be used by proper persons? Any other lethal instrument, such as a knife, is dangerous in the hands of a man who intends to commit suicide. Surely no level-headed man will condemn the use of mechanical killers firing a free bullet because five men have committed suicide with them. Of the remaining five fatal cases, two were boys aged thirteen years; one of these boys accidentally shot himself with a killer and died; the other was a boy at Bedford "killed by a bullet from a mechanical killer."

One is entitled to ask what right had boys of thirteen to be handling these instruments, or indeed to be in a slaughterhouse at all? This, again, is evidence of the misuse of mechanical killers, not of accidents arising out of their proper use. The other fatal cases, three in number, occurred as follows: In April, 1923, "a man was killed while using a pistol on a sheep, the bullet passing through his brain." If ordinary precautions were taken, and the slaughterer was following instructions issued with the instruments, how was it possible for the bullet to enter his brain? It is difficult to believe that this was an "accident" that could not and should not have been prevented. The next case is that of a man "seriously injured by the cap on humane killer failing to work and, flying off, struck the victim on the groin." He subsequently died. It is possible to admit this to be an accident truly connected with the proper use of the instrument, and it is the only fatal accident that might come under that category. On the other hand, it seems not improbable that the cap was not properly screwed home, if it was an instrument with a detachable cap, or that it was not in proper order when used. The last of these accidents having a fatal result is thus recorded by the N.F.M.T.A.:—"2nd April, 1915. Man seriously injured and subsequently died as result of an injury with a Captive Bolt Pistol. Person alleged to have inflicted the injury tried for 'culpably and recklessly discharging a Captive Bolt Pistol,' tried in Glasgow Justiciary Court on 4th August and found not guilty." Since the bolt of this pistol cannot enter anything unless it is pressed right against it, is one justified in regarding this an accident connected with the proper use of the instrument?

Now, any level-headed person studying this list of fatalities must in honesty conclude that with the possible, though not certain, exception of that which followed the blowing off of the cap, *all* these "accidents" should have been prevented with ordinary care.

Let us now study the other and non-fatal accidents, ten in number.

1. A Greener Safeti-Pistol either back-fired or splintered some bone and badly lacerated the right hand of the man when he was killing a pig. This accident *may* be regarded as a true accident connected with the proper use of the instrument. On the other hand, it may have been due to the instrument not being kept in proper working order.

2. A boy, age not stated, was sent into a slaughterhouse to fetch something for his master, and whilst there a sheep was shot, and the bullet went right through and ricocheted off the floor, went nine feet, and caused a wound in the boy's leg below the knee. I agree with the expressed opinion of the R.S.P.C.A. that the boy had no right to be present in the slaughterhouse during slaughtering.

3. When shooting a sheep "the bullet went through the head into the man's hand." The R.S.P.C.A. say this was due to gross carelessness, as stated in the report issued. It is impossible not to agree with this opinion, because if the man had followed the instructions carefully printed, the accident could not have occurred. The butcher had no right to have his hand in line with the pistol.

4. A killer jammed, when extracting the bullet it discharged and entered the butcher's hand. Presumably the butcher rammed the live cartridge back with the rod and forced it against the striking pin. It is clear that the man did not know how to remove a jammed cartridge, and, not knowing how this should be done, he should not have attempted

to do it, but should have passed the gun to a gunsmith or other person having the requisite knowledge. This is another accident that should not have occurred.

5, 6 and 7. In two of these cases a bullet entered the thigh of a man and in the other case a man's arm. It is quite clear that for these accidents to have happened the men must have been standing in front of the pistol, or if killing a sheep the thigh must have been under the animal's head. Here again the "accidents" should not have occurred if proper precautions had been taken.

8, 9 and 10. "Three men at Merklands received injuries while using gun on cattle." No details concerning these accidents have been supplied in the circulated list, without which it cannot be said if the accidents were due to the misuse of the killers or not.

In addition to the above accidents the N.F.M.T.A. place on record two instances of bullets having passed out of the head of the shot animals, one a sheep and one a pig, and which ricocheted in the building to the danger of workers. This concludes the list of "accidents," and it is, so far as I am aware, the only evidence that can be brought forward purporting to give support to the contention that mechanical killers firing a free bullet are too dangerous for use in a slaughterhouse.

Now the evidence supporting the claim that these instruments are perfectly safe if properly used, especially for the slaughter of cattle, is particularly interesting and, in my opinion, convincing. It is, presumably, well known that in Holland all animals, pigs included, have to be stunned prior to bleeding. In Rotterdam public abattoir there are killed on an average 40,000 cattle, bulls, bullocks, and cows, annually; for twelve years an instrument firing a free bullet has been used for this purpose exclusively. During this time, for the slaughter of approximately 480,000 bovines, there has not been a single accident. In Amsterdam abattoir, also a very large place, the instrument has been in use for ten years, and during that time there has been but one slight accident, when a spent bullet entered the flesh of a man's arm. In a letter to the *Lancet* (March 8th, 1924), Dr. W. C. Berry, M.O.H., Bloemfontein, says that the humane killer has been used in their abattoir for eleven years for the slaughter of 51,723 bovines and 11,813 pigs without a single accident. Dr. Forbes, M.O.H., Brighton, in a letter to the *Lancet* (January 12th, 1924), in which he pleads for the abolition of the pole-axe, says that over 3,000 beasts have been killed there with the mechanical killer, and that there has been no approach to an accident and no complaint as to the keeping quality of the meat. It is possible to produce very much more evidence to the same effect, but it is not necessary to do so.

The statement that these instruments are perfectly safe for the slaughter of cattle must be accepted by all persons willing to bring an unbiassed mind to the study of the question. If the free bullet instrument is really dangerous, is it likely that countries, local authorities, and individual butchers would have adopted its use to the extent they have? There are plenty of butchers who have voluntarily adopted the use of these instruments, and who speak very highly of their efficiency and safety. It is the more regrettable that people should say that these instruments are dangerous, when they are not when properly used, because butchers in general have dropped the objection to their use on the ground of supposed inefficiency and bad effect on the meat. Fear of accident is the only thing that keeps butchers back from welcoming the more general use of mechanical killers. There is no ground for such fear. It was recently described in Court as "anticipatory fear," not founded on experience. In a large abattoir known to me the instrument is not introduced because of this fear. It has been stated that it would be a very dangerous thing to issue mechanical killers to all butchers, jobbers and others in this slaughterhouse. I quite agree, and say further that it would be a most stupid and unnecessary thing to do. In Rotterdam and Amsterdam, which abattoirs I have visited, specially-chosen men do nothing else but shoot cattle. When a butcher is ready with a beast for slaughter, a given signal brings the official instantly and without delay. It is his business to see that nobody is in any way exposed to risk of accident, and, indeed, while thinking myself safe I have been ordered further back. If it is possible to organise and conduct an abattoir on these humane lines in Holland, surely it is equally possible to do so in Great Britain. Any large city having a public abattoir could well afford to employ a sufficient number of "killers" and to pay them their wages out of the rates. It is quite certain that the ratepayers would not object to this expenditure.

In short, the position with regard to the use of free-bullet-firing instruments is as follows:—

(*a*) *Cattle.* It has been proved in many large abattoirs that free-bullet-firing instruments are perfectly safe, even in crowded places, for the killing of bulls, bullocks, and cows, provided that the killers are used only by authorised persons. A properly-fired bullet does not pass through the bullock or cow and ricochet in the booth.

There is, therefore, no valid argument against the use of these instruments. They provide instantaneous unconsciousness; prevent the cruelty inseparable from the use of the pole-axe by learners; they do not spoil the meat.

(*b*) *Sheep and Lambs.* These animals can be killed with safety by the "Safeti" pistol firing a free bullet, provided that the right cartridge is used (there are special cartridges for lambs and sheep), and that sufficient care is taken in directing the pistol. It must be admitted—without cavilling—that unless great care is taken, bullets may pass through the head of a lamb or small sheep and ricochet to the danger of the workers. Now, a bullet that passes through the head of an animal, such as a lamb, and ricochets in a building, especially in a large public slaughterhouse where men are packed close killing sheep, is undoubtedly a dangerous and nerve-shattering thing. Butchers would be doing less than justice to themselves

if they failed to object to the use of these instruments for killing animals if they were convinced that their proper use is inseparable from danger. Owing to the fact that in a large slaughterhouse it would be impracticable to provide special men to do the shooting, and that *all* butchers cannot be relied on to exercise sufficient care while using the instruments, my own opinion is that an instrument firing a free bullet is not suitable for general use in a large crowded abattoir for the stunning of sheep. It may, however, be used, and is commonly so used, in smaller establishments, where its control is more easily guaranteed. Professor Hill says that with the pistol it requires two men to kill a sheep, one to shoot and one to bleed. This is not correct. One man can shoot a sheep, slip the discharged gun into a holster at his waist, and then bleed the animal. Professor Hill says that shooting means dearer meat. Now the only additional cost is the first cost of the instruments and the cost of the cartridges; but as Professor Hill says that shooting means dearer meat, he will, no doubt, be able to provide proof that in those localities where the use of a mechanical killer is compulsory, the meat is dearer to the consumer than it is elsewhere; also that the butchers who voluntarily use the gun—and there are plenty of them—charge more for their meat than those who do not.

(*c*) *Pigs.* My own experience is that the "Safeti" Pistol is reliable, safe, and efficient, provided that it is used with ordinary care. It is rather unsatisfactory if it has to be used in an ordinary pen where pigs have to be manœuvred into position and held by an ear or run back into a corner. Professor Hill seems to have the impression that this manœuvring in a pen is inseparable from the use of a mechanical killer. This is not the case, as use can be made of a pig-trap, which will be described presently. I have killed many pigs for the fresh pork trade and some for bacon with both the "Safeti" Pistol and the Captive Bolt Pistol, and appreciate the fact that it is difficult sometimes to get a loose pig into position and keep it there for the shot. As I am convinced from what I have seen that more unnecessary cruelty is perpetrated on pigs during their slaughter than on any other animal, and as the method of slaughtering pigs is being very much discussed at the present time, it is advisable to deal with it in detail.

Pigs are killed by various methods. They may be hoisted by a hind leg by means of a block and tackle or by an electric or other mechanical hoist and, hanging head down, be stuck and allowed to bleed to death. It is contended that this method of killing is not so humane as proper stunning, because the incision is painful, very painful and prolonged when the knife is in the hands of a learner, and that unconsciousness does not ensue immediately the cut is made. Professor Hill says this method cannot fail, yet a veterinary surgeon, one of some age and experience, has told me that not long ago he saw a pig imperfectly stuck, dropped into the scalding tank while, as he expressed it, "it was still very much alive." This method of killing *can* therefore fail. It is not for a moment suggested that such a horrible thing happens frequently or that it is any other than a very rare occurrence. But it has happened. One can, without hesitation, understand that in any well-conducted bacon factory a slaughterer responsible for such bad workmanship and cruelty would be dismissed instantly.

A common method of killing pigs, especially in country places, is to bench the animals and then stick them without previous stunning; sometimes they are tied to the bench and at others are allowed to stagger about until they fall exhausted from loss of blood. In England I have seen a rope fixed round the upper jaw of a large heavy bacon pig, and by means of a block and tackle fixed to a beam in a stable, hoisted up until its fore feet were well clear of the ground; then it was stuck. In the same district I knew a pork butcher who cured bacon, and who stunned every pig prior to bleeding by means of the sliding pin. Since he was a prosperous man it may be assumed that he made good bacon.

In many slaughterhouses all pigs, whether intended for bacon or not, are stunned by means of a wooden maul, iron hammer, or in the case of large sows and boars with a small pole-axe. I have seen a great many pigs so killed. The common custom is to drive half-a-dozen or so pigs into a pen, fell them with a maul, and then stick them. The maul in the hands of a careful expert is fairly efficient; in the hands of youths, learners or careless men it is responsible for gross cruelty. I have on more than one occasion seen pigs hit with a maul six times before falling unconscious. A well-known pork butcher who kills a very large number of pigs has expressed to me his disgust at the manner in which a certain class of slaughterers kill pigs when using the maul. Pigs with heads of a certain shape are very difficult to stun with a wooden maul, and an experienced butcher has told me that if the first blow is not effective, it causes an immediate sub-cutaneous swelling which makes subsequent blows less effectual. Now, not one of these methods, with the exception of the sliding pin, which is placed on the head and driven in, can be called satisfactory.

Fortunately, however, there is a method of securing and stunning pigs of which it can be said that it is humane, efficient, and satisfactory. As most people seem to have the idea that in order to use a mechanical killer or a sliding bolt on a pig much time has to be lost in manœuvring the animal into position, it may be assumed that the method to be described is not known to them. In many slaughterhouses in Holland there is in use what is known as van Dorp's Pig-Trap. Each animal is driven along a narrow way into the trap, which, as the photograph shows, has inclined sides; as soon as the pig is in the trap a lever is moved which causes the bottom to fall away and thus the pig is suspended by the sloping sides with its legs off the ground. The animal cannot move, and it is not in a painful position.

Immediately it is in position a sliding bolt is placed on its head, and this is driven in by a maul. As soon as it is stunned, another lever is moved, which tilts up the trap and the pig slides off on to the floor, where it is bled. As soon as the carcase reaches the floor a chain can be attached to a hind leg, and the animal hoisted and bled head down, or a man can stick the pig while another man attaches the chain. This represents the humane slaughtering of pigs. The trap is made to work either to the right or left. Its cost is £30 f.o.b. Hamburgh, and the inventor and maker is J. J. van Dorp, Archimedesstraat 41, The Hague, Holland. There are seven of these traps in Amsterdam abattoir; is there any reason why they should not be used in Great Britain?

Fig. 1.—J. J. van Dorp's Pig-Trap. The pig in position to be stunned by means of the sliding pin.

Fig. 2.—J. J. van Dorp's Pig-Trap. The stunned pig ready for hoisting and bleeding.

Can stunned Pork be made into Bacon? A great many bacon-curers, probably the majority in this country, say that owing to incomplete bleeding and "splashing," it is impossible to make good bacon, and that their trade will be ruined if the use of a mechanical killer is made compulsory. They say, indeed, that pigs must not be stunned at all, but that they must be hung up and then stuck. If this is the case, how is that some bacon-curers can make good bacon when the pigs are stunned before bleeding? One would think that what one curer can do all could do. In what is known as the Reading case, five bacon-curers testified that they could and did make good bacon when the pigs were stunned. Indeed, scattered all over the country are people who make very good bacon from stunned pork. In Holland all pigs, as I have said, are stunned before bleeding, and usually with the sliding pin, which is driven right into the brain. There is a considerable import into this country of Dutch fresh pork, and it is well known that a proportion of this pork is made into bacon here. How is it possible to make good bacon from stunned Dutch pork if it is not possible to make good bacon from stunned British pork? I have eaten just as good bacon and ham in Holland as I have in Great Britain.

No thorough and exhaustive test has ever been made of the effect of stunning pigs on the curing and keeping qualities of the pork. Being interested in this matter, some months ago I approached one who has considerable knowledge of the meat industry, and asked him if it would be possible to organise an extensive and really thorough test of the whole matter. Since some curers say stunned pork cannot be made into good bacon and others say that it can, then surely this is the obvious thing to do. Professor Hill, testing the blood content of muscle taken from the few pigs killed at the Birmingham demonstration, and finding more blood in the tissues of the shot pigs, concludes from this that pigs should not be stunned before bleeding. But the foundation of his experiment was so faulty that the results are quite misleading. He has stated that there was considerable delay in bleeding the pigs after shooting; in one instance no less time than three minutes elapsed before bleeding. Naturally one would expect to find more blood in the flesh of pigs treated in this manner than in that of those hung up and bled without previous stunning. One would be surprised if that were not the case. The delay at this demonstration was clearly due to the

convulsive movements brought on by the shot before bleeding. It is a well-known fact that if a mechanical killer is used, whether captive bolt or free bullet type does not appear to matter, the animal should be bled, if possible, before the onset of reflex convulsive movements. In my experience this is sometimes very difficult to do, but this difficulty can be got over by passing the cane or wire immediately after shooting, which hastens the onset of convulsive movements, and causes them to be of shorter duration, without in any way affecting the pork so far as I have been able to see. A few months ago a cattle dealer and pork butcher in a big way of business gave me facility to try the improved type of Cash's Captive Bolt Pistol on pigs. This man and his two sons witnessed the trial, when several big pigs and one sow were shot. The second pig went into convulsive movements almost immediately, but one of the butchers, who had never seen the instrument used before, said that such a difficulty could easily be avoided by passing the cane. This was done on each pig afterwards with excellent results. At this trial I particularly asked the butchers to see if the carcases bled any less well than those they stunned with the hammer, and they replied that they failed to see any difference.

It would seem to me that if pigs are stunned in a pig-trap, such as van Dorp's, and afterwards hoisted and bled head down, there is no reason why they should not bleed perfectly well and thereafter be made into good bacon. In the trap a "Safeti" pistol firing a free bullet could be used, or Cash's Captive Bolt Pistol, or the sliding pin and maul; any one of these methods is efficient and safe. The free bullet is safe because accurate aim can be taken, which it is sometimes difficult to do when the pig has to be held in a pen.

Professor Hill refers to the method of stunning cattle in Australia, and says that it is an excellent method, but he does not seem to be aware of the fact that a stunning pen (Medcalf's Stunning Pen) of a similar nature is in use in this country. Some time ago I went to Glasgow for the purpose of examining the pen at Merkland's Wharf, where the manager, Mr. D. R. Campbell, had had one installed. Being anxious to know if Mr. Campbell is as satisfied with the pen as he was when it was first used, I wrote this week and asked him to send me his views. His reply says: "I am still satisfied with it, and I consider it is the best arrangement I have ever seen for slaughtering cattle. I was in Canada and the United States during last autumn, and the stunning pen was in operation in every abattoir I visited, the only difference being, the stunning pen in America gives accommodation for three animals at a time, and my erection only holds one. I think that the pen to hold one animal is better and more humane, as no other animal can see the occupant being felled." A description with photographs of this pen is given in the *Imperial Food Journal* June 22nd, 1922. It is a portable pen, into which the animal to be killed is driven. Cattle enter the pen without any objection on their part, and thus it does away completely with the hauling and twisting of a frightened beast over a blood-slippery floor where other animals are in the process of being dressed. The bullock stands naturally in the pen and can be felled by the pole-axe, hammer, or mechanical killer. Mr. Campbell has placed a hay rack at the end of the pen at Merklands, and the animal, seeing the hay, steps forward the more readily and without suspicion that it is to be killed.

One is entitled, I think, to say that this represents the "Humane Slaughtering" of cattle. When the animal drops stunned, the slaughterman releases a catch, and then the weight of the fallen beast tips up the floor, throws open the side, and the stunned beast is slid out on to the bleeding floor. One feels confident that those responsible for the conduct of slaughterhouses, and the butchers themselves, have only to become acquainted with this pen and the wish to adopt it will be theirs. People really interested in the conditions under which cattle are slaughtered should read the article describing this pen in the journal above mentioned.

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The Consciousness of Animals.

Have animals intended for slaughter and brought into a slaughterhouse any consciousness of approaching death? Are they subjected to fear and anxiety by the sight of slaughtered animals and the smell of blood?

These questions have been asked many times, and have been discussed from every angle by veterinary surgeons, medical men, butchers, knackers and others. Professor Hill says:—"It must be borne in mind that animals have no more consciousness of death than uneducated babies have. Man's recognition of the hideousness and horror of the slaughterhouse is the result of education. It is absurd to think—as sentimental people do think—that animals are conscious of the presence of a dead carcase, or spilt blood." I am not aware that medical men, veterinary surgeons, butchers and knackers are especially "sentimental," and yet among them there are many who will say that animals certainly do have some degree of consciousness of approaching death, and are affected by the smell of spilt blood. Others will agree, doubtless, with Professor Hill. It would serve

Immediately it is in position a sliding bolt is placed on its head, and this is driven in by a maul. As soon as it is stunned, another lever is moved, which tilts up the trap and the pig slides off on to the floor, where it is bled. As soon as the carcase reaches the floor a chain can be attached to a hind leg, and the animal hoisted and bled head down, or a man can stick the pig while another man attaches the chain. This represents the humane slaughtering of pigs. The trap is made to work either to the right or left. Its cost is £30 f.o.b. Hamburgh, and the inventor and maker is J. J. van Dorp, Archimedesstraat 41, The Hague, Holland. There are seven of these traps in Amsterdam abattoir; is there any reason why they should not be used in Great Britain?

Fig 1.—J J. van Dorp's Pig-Trap The pig in position to be stunned by means of the sliding pin

Fig. 2.—J. J. van Dorp's Pig-Trap. The stunned pig ready for hoisting and bleeding.

Can stunned Pork be made into Bacon? A great many bacon-curers, probably the majority in this country, say that owing to incomplete bleeding and "splashing," it is impossible to make good bacon, and that their trade will be ruined if the use of a mechanical killer is made compulsory. They say, indeed, that pigs must not be stunned at all, but that they must be hung up and then stuck. If this is the case, how is that some bacon-curers can make good bacon when the pigs are stunned before bleeding? One would think that what one curer can do all could do. In what is known as the Reading case, five bacon-curers testified that they could and did make good bacon when the pigs were stunned. Indeed, scattered all over the country are people who make very good bacon from stunned pork. In Holland all pigs, as I have said, are stunned before bleeding, and usually with the sliding pin, which is driven right into the brain. There is a considerable import into this country of Dutch fresh pork, and it is well known that a proportion of this pork is made into bacon here. How is it possible to make good bacon from stunned Dutch pork if it is not possible to make good bacon from stunned British pork? I have eaten just as good bacon and ham in Holland as I have in Great Britain.

No thorough and exhaustive test has ever been made of the effect of stunning pigs on the curing and keeping qualities of the pork. Being interested in this matter, some months ago I approached one who has considerable knowledge of the meat industry, and asked him if it would be possible to organise an extensive and really thorough test of the whole matter. Since some curers say stunned pork cannot be made into good bacon and others say that it can, then surely this is the obvious thing to do. Professor Hill, testing the blood content of muscle taken from the few pigs killed at the Birmingham demonstration, and finding more blood in the tissues of the shot pigs, concludes from this that pigs should not be stunned before bleeding. But the foundation of his experiment was so faulty that the results are quite misleading. He has stated that there was considerable delay in bleeding the pigs after shooting; in one instance no less time than three minutes elapsed before bleeding. Naturally one would expect to find more blood in the flesh of pigs treated in this manner than in that of those hung up and bled without previous stunning. One would be surprised if that were not the case. The delay at this demonstration was clearly due to the

convulsive movements brought on by the shot before bleeding. It is a well-known fact that if a mechanical killer is used, whether captive bolt or free bullet type does not appear to matter, the animal should be bled, if possible, before the onset of reflex convulsive movements. In my experience this is sometimes very difficult to do, but this difficulty can be got over by passing the cane or wire immediately after shooting, which hastens the onset of convulsive movements, and causes them to be of shorter duration, without in any way affecting the pork so far as I have been able to see. A few months ago a cattle dealer and pork butcher in a big way of business gave me facility to try the improved type of Cash's Captive Bolt Pistol on pigs. This man and his two sons witnessed the trial, when several big pigs and one sow were shot. The second pig went into convulsive movements almost immediately, but one of the butchers, who had never seen the instrument used before, said that such a difficulty could easily be avoided by passing the cane. This was done on each pig afterwards with excellent results. At this trial I particularly asked the butchers to see if the carcases bled any less well than those they stunned with the hammer, and they replied that they failed to see any difference.

It would seem to me that if pigs are stunned in a pig-trap, such as van Dorp's, and afterwards hoisted and bled head down, there is no reason why they should not bleed perfectly well and thereafter be made into good bacon. In the trap a "Safeti" pistol firing a free bullet could be used, or Cash's Captive Bolt Pistol, or the sliding pin and maul; any one of these methods is efficient and safe. The free bullet is safe because accurate aim can be taken, which it is sometimes difficult to do when the pig has to be held in a pen.

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no useful purpose to enter upon a long discussion on this question, because, until it is proved beyond question that animals are not affected by the smell of blood, and have absolutely no fear of death, it is clearly our duty, a duty not biassed by sentiment, to act as if they are conscious of death, and to give them all the protection we can. There is an unwritten law to the effect that in all matters relative to the welfare of animals where there is any doubt, the benefit of that doubt is always to be given to the animal.

Conclusions of Mr. Brennan DeVine and Professor J. MacQueen.

Some conclusions, formulated as the result of their experience at the Birmingham Demonstration by Mr. DeVine and Professor MacQueen were published in the *Veterinary Record*, March 15th, 1924. Mr. DeVine says that the pole-axe is as successful in stunning cattle as any of the other instruments used. One might almost agree with Mr. DeVine that this was the case *at this particular demonstration* were it not for the fact that, even with the limited number of cattle used, one animal required two blows of the axe before it was rendered unconscious. Mr. DeVine refers to the rapidity with which a second blow is given if the first fails; surely he knows that learners make more than two blows at a beast when they are learning how to use the axe? In support of his plea for the continued use of the pole-axe, Mr. DeVine quotes from the findings of the Admiralty Commission,—"The Committee are of the opinion that the pole-axe, when used by an expert, is, on the whole, the most satisfactory instrument."

I feel that it is necessary to complete this quotation· "In coming to this conclusion they must add that in the hands of a nervous or inexperienced man the pole-axe becomes an uncertain weapon, and may be productive of much suffering.

"The Committee, therefore, recommend that no man should be permitted to use the pole-axe on a living animal until he has gone through a thorough course of training, firstly, upon a dummy animal, and, secondly, upon dead bodies."

In the second place I wish to draw attention to the fact that the Committee started their work in 1904: thus the investigations as to the relative merits of mechanical killers were commenced twenty years ago, when these instruments were in the initial experimental stage.

When considering the slaughter of pigs, Mr. DeVine says: "An attempt was made to stun a pig with a Dutch Captive Bolt instrument, operated by compressed air. This instrument failed in its action, probably due to the fact that the pig was not shackled and kept still, so that the instrument could be kept pressed against the head while being fired." Professor MacQueen says: "Of the six methods of killing pigs tried at the Demonstration, the least satisfactory was the Dutch, which signally failed." So far from saying that the Dutch method signally failed, I think that it would be more fair to say that it was the operator who signally failed. In any case it is doubtful if one attempt to use this instrument at a demonstration to which so much importance has been attached can be taken as a fair test. I have never seen this instrument used in Holland, but I have been told by a member of the Royal College of Veterinary Surgeons who has seen it used at the Hague that it works very well indeed.

Then Mr. DeVine says: "I am of the opinion that the demonstration proved that the mechanically-operated instrument which depends on an explosive for its action is not, in its present condition, a practical instrument for every-day use." This opinion is quite the reverse of those persons who have had extended practical experience of the use of mechanical killers, especially for the slaughter of cattle. As I have shown, in some large abattoirs the mechanical killer is the only instrument used for the slaughter of cattle, and the experience of more than ten years in these places had proved conclusively that the instruments are of great practical utility.

With regard to Mr. DeVine's argument that the compulsory shooting of animals here will improve the business of the foreign meat traders, I need merely say that both veal and pork are imported into this country from Holland, where *all* animals have to be stunned before bleeding. Further, one of the leading butchers in Edinburgh always shoots his cattle, and this is also true of one of the leading butchers in Glasgow. There is no evidence to show that their business has suffered from the adoption of the "humane killer," or that they have given any encouragement to the import of foreign meat.

Finally, Mr. DeVine says: "The slaughtering of animals in any form in most centres is carried out by experts, and under these conditions unnecessary pain to the animals is reduced to a minimum." What, then, is the condition in the centres not included in the "most"? If it is only in "most" centres that expert slaughterers are engaged to kill animals, how are the animals killed elsewhere? It is also of importance to know by what process the experts become expert in their trade. If they are born expert killers, then the plea for the adoption of mechanically-operated instruments very largely fails; if it is by a procedure of prolonged experimentation on the living animal, then neither demonstration nor argument can weaken the stand made by those of us who believe that the general adoption of the mechanical killer will lessen the sufferings of animals slaughtered for our food.

In conclusion, as Mr. DeVine has quoted from the Admiralty Report (CD 2150), may I add another quotation: "All animals, without exception, should be stunned, or otherwise rendered unconscious, before blood is drawn."

Special inspectors for the purpose of detecting sheep-scab are being appointed by the Breconshire Diseases of Animals Committee.

Clinical Note.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases.

Removal of the Bovine Fœtal Membranes by Uterine Lavage.

By W. Rutherford Wallace, M.R.C.V.S., Edinburgh.

The question of the removal of the fœtal membranes, manually or otherwise, may well be termed a hardy annual, and at this season a few notes on their removal by uterine lavage may not be out of place.

Most observers are agreed that, be the contributory causes what they may, the direct or essential cause of retention of the fœtal membranes is an atonic condition of the musculature of the uterus, whereby normal post-parturient uterine contraction does not take place. The effect of this placidity of the uterus is retention of the fœtal membranes.

Obviously, then, our aim being to remove the cause and mitigate the effects, rational therapy lies in inducing post-parturient uterine contraction, so removing the cause, and, to mitigate the effects, we must free the interior of the uterus from toxins, the result of bacterial activity in the decomposing fœtal membranes.

Manual removal, then, can hardly be said to be rational treatment, as its aim is to remove the effects and mitigate the cause, and when carried out on the third day following parturition, it can hardly be claimed to be a surgical achievement, as it entails the opening of blood vessels in some hundred maternal cotyledons situate in the midst of a field laden with toxins from the decomposing membranes, thus opening up a direct path for rapid toxin absorption, and should the cow survive the ordeal, it may well be said that it does so, not as a result of the treatment, but in spite of it.

Manual removal could only be defended on surgical grounds if carried out within about twelve hours of calving.

Uterine lavage, on the other hand, is both rational and surgical, its object being two-fold. Firstly, it aims at removing the cause by stimulating uterine contraction, and, secondly, by its mechanical effects; it dilutes and flushes out toxins from the uterus, so mitigating the effects without entailing the opening of any blood vessels to provide a portal of entry for toxins. But perhaps its highest recommendation, from the practitioner's point of view, is, that following this procedure, a death is a rarity. To those who object to the treatment on account of the odour for a few days, we may aptly reply, that a live aromatic cow is better than a dead non-aromatic one.

To proceed, then, with treatment itself, this is initiated on the fourth day following parturition with a dose of sodium chloride in treacle, which acts both as a laxative and as a toxin eliminator. It is followed up with medicinal doses of nux vomica, sodium chloride and sodium bicarbonate, in order to induce contraction of the plain muscle of the uterus, and to remove any absorbed toxins—now diluted in the system by the therapeutic action of the sodium chloride—by the kidneys. The diet should be light and laxative, including green food if available. Should loss of appetite or stiffness of the hind limbs (so-called metastatic arthritis) appear before the fourth day following parturition, treatment is commenced forthwith.

In preference to pumps and metal catheters—the use of which is always attended with danger in a restive animal—a piece of ordinary ½in. garden hose-pipe, about 3ft. 6in. long, is introduced through the *os uteri*, and a funnel inserted in the other end. Through this is poured, with the aid of a jug and gravity, two or three gallons of hot water, to which has been added a dessertspoonful of lysol (1-1000), the idea of the antiseptic being to produce what is popularly referred to as sterile water. Lysol is probably the most useful agent for the purpose on account of its inherent cleansing qualities, and stronger solutions should not be used, as they only act as irritants, and it is useless to contend that they will destroy bacteria hidden in the crevices of the cotyledons. Moreover, when the effect of even ½ per cent. lysol on the skin of the human arm is considered its effect on the uterine mucous membrane may well be imagined.

The temperature of the solution is of more importance than the strength, and it should be as hot as can be comfortably borne by the skin of the human elbow, the idea being to stimulate normal contraction of the uterus.

When two or three gallons or more have been introduced, according to the holding capacity of the flaccid uterus, the cow will probably immediately expel it, and, if very dirty, the procedure should be repeated with fresh solution. Should the toxin-laden fluid not be expelled, the tube should be left *in situ* hanging downwards, while the hand is introduced and the *os uteri* titillated, or the tube may be gently moved backwards and forwards, when the flow will soon commence, and the fluid is then automatically removed by syphonage. It is really quite immaterial whether all the fluid is withdrawn or not, as the resulting uterine contractions will soon expel any left. The tube is now removed, and a portion of the membranes, if possible, is drawn through the *os uteri* to prevent closure. This lavage is carried out every second day—unless the cow is showing signs of metastatic pneumonia, when it should be done daily, and a smart mustard plaster applied to the chest—till the membranes can be removed by a very slight degree of traction or rotation. Should the membranes break down into a bloody grumous material, lavage is carried out every second day till the returned fluid is fairly clean.

Should the client be a man who is impressed by the exhibition of iodoform, and the practitioner have a desire to see his ledger well filled up, pessaries

(*Continued at foot of next page.*)

Divisional Reports.

Central Division.

A meeting of this division was held at the R.C.V.S., 10 Red Lion Square, W.C., on Thursday, April 3rd, 1924, the President, Major G. Rees-Mogg, occupying the chair.

The following Fellows signed the attendance book :—Messrs. A. H. Andrew, W. Brown, R. Bryden, J. C. Coleman, W. R. Davis, G. W. Dunkin, R. J. Foreman, H. Kirk, Professor E. G. Langford, Mr. G. H. Livesey, Professor J. MacQueen, Mr. J. W. McIntosh, Sir J. Moore, Messrs. W. J. Mulvey, H. J. Parkin, W. Perryman, C. H. Sheather, P. W. D. Smith, S. H. Slocock, S. L. Slocock, T. Spencer, F. H. Stainton, F. Ware, W. F. Widden, A. E. Willett, J. Willett, E. C. Winter, Professor G. H. Wooldridge, and Mr. J. F. Macdonald (Hon. Secretary).

Visitors :—Lt.-Col. J. W. Brittlebank, C.M.G., Messrs. A. A. Forsyth, H. C. Gregory, and A. W. Stableforth.

The *minutes* of the two preceding meetings, having been published in the *Record*, were taken as read and were confirmed and signed.

Correspondence.

The Hon. Secretary read the following letter from Major P. J. Simpson, of Maidenhead, who was prevented from attending by reason of his recent operation :—

Henrietta House, 14 Henrietta Street,
Cavendish Square, London, W.,
March 31*st*, 1924.

Dear Mr. Macdonald,

Will you as Secretary kindly convey to the President and members my apologies for not being able to be present at the meeting next Thursday, the reason is known to many of them. Am going on extraordinarily well; and shall look forward to meeting all friends again in April.

Please convey also my congratulations to Mr. Trevor Spencer on his paper, the contents of which should, in my opinion, be brought to the notice of the milk-consuming public as forcibly as possible, although the question of entrusting municipalities with the control of the milk supply does not appeal to me, especially when Government Departments turn down legislation for the control and distribution of tuberculin—what might be termed the key to tubercle-free milk.—Yours sincerely, P. J. Simpson.

Additional apologies for absence were received from Major F. T. G. Hobday, M. G. P. Male, Captain Glyn Lloyd, Messrs. C. D. Pritchard, H. L. Roberts, E. L. Stroud, J. Wright, and Colonel T. Dunlop Young.

The Hon. Secretary was instructed to write Major Simpson, sympathising with him in his illness and wishing him a speedy recovery.

Captain Glyn Lloyd, D.S.O., M.R.C.V.S., was elected a Fellow of the Society (proposer, Major Hobday; seconder, the President).

Morbid Specimens.

Mr. J. Willett : I have here two specimens from the same animal. The subject was a bulldog, about eleven years old, and he had, as you will see, a very large left testicle. He also had an affection of the anus, which looks to me like an epithelioma. This growth was operated upon three times, but it recurred, and eventually I destroyed the dog.

On opening him, about five pints of blood-stained serous fluid came out. The liver weighed four pounds, the kidneys were normal, the heart was enlarged, and the spleen, as you can observe, had several growths in it, one of which had undergone degeneration and started hæmorrhage. I am rather inclined to think that the trouble was of a malignant nature.

Mr. R. J. Foreman showed a specimen retrieved from a knackerman's boiler, consisting of the lower end of the limb of a horse revealing very extensive unilateral ossification embracing the fetlock, pastern and coffin joints.

Mr. C. H. Sheather exhibited the pelvis of a hunter which presented distortion of the bones. The animal had been seen by him a fortnight after cub-hunting, when it showed little lameness, and he diagnosed strain of the gluteal muscles. It was three weeks before he was called in again, when he found the lameness (which was more the lameness of immobility than of actual pain) more marked. Examination now revealed the case to him as hopeless, and the horse was destroyed. He wished to ask the members for their opinion as to the possible cause of pelvic distortion as revealed by the specimen.

Captain H. Kirk : The morbid specimen I have here is the kidney of a full-sized Yorkshire terrier. The carcase was brought to me for an autopsy, the history being that the dog went out into the street, returned in about ten minutes, started to pant and stagger, and five minutes later rolled quietly over, dead. Upon opening the abdomen, I found it full of bright blood. The left kidney was ruptured to such a degree that it looked like a mass of red pulp; hence the hæmorrhage and death. I have brought the sound kidney, that the two may be compared. In order to ascertain whether external violence had been the exciting cause of this condition, I skinned the back, but failed to discover the least sign of bruising or cutaneous hæmorrhage. And so far I have not discovered the pathology of the condition, nor can I explain why this kidney spontaneously ruptured.

(*Continued from previous page.*)

of iodoform and boric acid may be inserted after lavage, but otherwise they are quite unnecessary, though harmless.

By this method of treatment the membranes usually come away on the sixth or eighth day following parturition, and at the latest on the tenth day. No difficulty is experienced in again getting the cow pregnant, and even the "risk" of a death may safely be said to be non-existent.

I would like to record what I consider to be a most interesting case which has recently passed through my hands. About nine months ago I was called upon to treat a cat (then about ten months of age) for paraplegia. Laxatives and Easton's Syrup were prescribed, and the cat recovered sufficiently in three weeks to be sent home. There was a subsequent full recovery.

Last December, however, I was sent for again, and found this cat in a state of hyperæsthesia, very nervous, and wishing always to hide. Its gait was staggering and its appetite poor. Bowels costive. The supersensitiveness soon passed away, and I resorted to my former treatment with Easton's pills (each containing strychnine) to combat the loss of co-ordination and muscular power. Nine days of this treatment had effected no result, so the cat was admitted to my infirmary. Paralysis of the hind limbs was complete, appetite very bad, constipation marked, but temperature, pulse and respiration always normal. In a further week the paralysis had extended to the fore limbs, and the cat was blind. It had, in addition, become reduced to a mere skeleton. In fact, to pick it up was like lifting a bag of feathers. I had the cat X-rayed in an endeavour to find some causal lesion in the spinal column, but could discover nothing. My treatment was a pill containing phosphorus $\frac{1}{3\frac{1}{2}}$ gr. and zinc valerian 1 gr. once daily. The dorsum was blistered with cantharides ointment, and an emulsion of cod liver oil, with hypophosphites, was forcibly administered. Chicken jelly, sardines, and other delicacies were offered and taken. On February 4th I changed the phosphorus pill for Easton's pills, and then came a visit from the owner, who asked, "was she justified in continuing the expense if there was little or no prospect of recovery?" I admitted the doubt, but would not abandon the case, and I offered to treat it henceforth at my own expense. The cat continued to attempt to drag itself about the floor, knew nobody, and was painfully emaciated. Then suddenly it developed an appetite, and I allowed it to take its fill, each meal time, of raw beef. It then began to cry for food and appeared to be better able to drag itself after the kennel maid. My interest was intense. I used to prop the cat up between two baskets for a change of position and to allow it the better to eat and drink. From that time it never looked back, and on February 25th was able to climb my surgery stairs, and nearly got into the street. Sight had returned also. It was discharged on the 26th with still a rolling gait, but with a much better covered frame, and all medicinal treatment was stopped, except that the owner was advised to give it Sanatogen. I received a letter to-day to the effect that the cat is now as well as it ever was. Now this appears to have been a case of myelitis, and it is the third I have successfully treated during the last four months. The result, which may be obtained by perseverance, only goes to prove how undesirable it is, from every viewpoint, to advise destruction too precipitately.

Mr. J. F. MACDONALD: In reference to Mr. Sheather's specimen, I should like to ask him if there was any sign of disease at the head of the femur, of a similar kind to what one sees in the acetabulum there. I certainly should suspect that there had been a fall. We have a case under treatment at the moment which I rather suspect to be something similar to that, and I am afraid it will do no good. The animal came from Dundee by boat to London, and is a young Clydesdale. He disembarked only a little lame, but the lameness has been progressive ever since. The case does not yield to treatment in any way, and the muscles of the quarter are considerably atrophied. It has all the appearance of hip-joint trouble.

Replying to Mr. Macdonald, Mr. SHEATHER said that he saw the cob last June or July. It was brought as a show jumper, and it was an average one, but a magnificent hunter. The cob came home after a very good run, and before I saw it the case was diagnosed as stifle lameness. I diagnosed, after external and *per rectum* examination, as strain of the gluteal muscles. I do not know what treatment was carried out, but I believe the animal was blistered twice. When I first saw him there was no such distortion of the pelvis as is revealed by the specimen, and there was typical hip-joint lameness, but it was not excessive. Even when I saw him three weeks ago he could get down and up again. What struck me was the extraordinary distortion of the pelvis without fracture.

Professor WOOLDRIDGE: With regard to the specimens exhibited by Mr. Willett, it is an interesting thing to find the testicle involved at the same time that there is an epitheliomatous growth at the anus, but I doubt if the two are in any way connected. In my experience, anal tumours are malignant by recurrence, but rarely in any other way. I recently saw a case in a spaniel, however, where there was a primary anal tumour, and by examining in that case *per rectum* one could feel a series of other tumours. The involvement of the testicle in the case before us is, I think, much more likely to be a coincidence than due to any infection of the one from the other.

Concerning Mr. Kirk's case of ruptured kidney, it occurs to me that it may have been a case of the animal having been run over, the hæmorrhage having taken place subsequently, though it may not have been noticed at the time. I had a similar case of ruptured liver in a cat, where the animal was found dead in the owner's study. In that case also there was no history of injury.

Mr. SHEATHER: I should like to ask the Fellows if, in their opinion, it is desirable to breed from foxhounds which are "roarers." I have come across some cases in which the hound makes a noise just as a horse does.

Mr. MULVEY: Is it the snuffling noise which we often find the hounds make, or is it a harsher sound? The former is due to catarrh of the mucous membrane or the nasal passages, and in course of time they recover. Broken-winded hounds, however, are quite common.

Mr. SHEATHER: I have met with two or three hounds which undoubtedly whistle. The cases appear to be on all fours with what one finds in horses.

Mr. PERRYMAN: When Mr. Sheather examined the horse with the distorted pelvis, did he detect any sort of creaking noise in the region of the hip joint? It has occurred to me that probably the teres ligament was ruptured, the joint partially dislocated, and as a result the head of the femur rode out from the acetabulum. There is no fracture there, but if that had existed for any length of time, it would have materially affected the obturator nerve.

Mr. SHEATHER: I can only repeat that the lameness started as very slight. I am at a loss to explain the condition, unless, the animal being a young horse, it might have been a green-stick fracture which more or less affected the acetabulum.

Professor WOOLDRIDGE: It looks to me as though the original injury was probably to the insertion of the capsular ligament, the injury having extended from that point as a periostitis, which would account for the lesions of the pelvis.

Mr. LIVESEY: I should like to ask Mr. Sheather a little more about the foxhounds that whistled. Has he noticed if there is any thickening of the epiglottis? I have seen a condition of enlargement of the uvula which will cause a whistling similar in many ways to the sound a whistling horse will make. A hound will also make a whistling from a thickening of the vocal cords, but I have never yet met with any affection of the larynx of the dog which will produce a sound in any way comparable to that made by the roaring horse.

With regard to Mr. Kirk's case of ruptured kidney, in my view there is no doubt that the dog must have suffered from a blow. I think such a blow might well be given in the form of a glancing blow from a car with a partially deflated tyre. Such a blow ordinarily gives little indication of bruising.

Mr. SHEATHER: My experience of whistling hounds is confined entirely to hearing the noise whilst hunting. I have had no opportunity of examining the larynx in these hounds. The Master of the Hounds recognised the noise.

ANY OTHER BUSINESS.

The HON. SECRETARY: I do not know whether the Fellows wish to take any action in the matter, but a resolution is coming up for the consideration of the London County Council to remove the horse from the streets of London. Whether or not it is to be taken seriously I do not know. I do not make any proposition.

No comment having been made, the PRESIDENT requested the opinion of the Fellows as to whether, now that the Society had adopted the plan of printing and circulating, prior to the meetings, the papers which were to be presented, they desired that these should be read, or that the discussion upon them should be at once entered upon.

Mr. MCINTOSH proposed that the reading of the papers should be dispensed with, and this was approved,

(*Continued at foot of next column.*)

Notes and News.

The Editor will be glad to receive items of professional interest in these columns

Diary of Events.

May 1st—Meeting of the Central Division at the R.C.V.S., 10 Red Lion Square.

We read that Mr. W. J. Ironside, M.R.C.V.S., has arrived in South Uist in order to give some lectures to the crofters on the diseases of cattle, horses, and sheep. He is proceeding on a similar mission to Benbecula and North Uist later. This tour is arranged by the North of Scotland College of Agriculture.

* * * *

If the Congress of the Association is to be a thorough success, and if we are to obtain all the concessions we want in the way of travelling facilities, it is essential that we have a big attendance. It is to be hoped that every member will do his utmost to travel to Aberdeen and so arrange for a pleasant and instructive week or ten days in Scotland. The date of the meeting is September 8th to 13th, both dates included.

* * * * * * *

The Liverpool Echo prints a report from Khartoum that up till the middle of last month a man-eating lion terrorised the village of Niala and its vicinity by repeated raids.

"Two natives," the report continues, "while travelling on the road between Bahr-el-Jebel and the village, unwittingly lay down in the scrub near its haunt and fell asleep. The lion leaped out on them and killed both. Many other victims were claimed by the man-eater.

(*Continued from previous column.*)

no support being forthcoming for Mr. COLEMAN'S suggestion that the writers should be afforded an opportunity of submitting a vocal précis.

The PRESIDENT: I should like to say that we are very grateful indeed to Colonel Brittlebank for coming all the way to open the discussion upon Mr. Trevor Spencer's paper, which is now before us. (Applause.)

The meeting proceeded to the discussion of Mr. Spencer's paper on "Would Municipalisation Solve the Milk Problem?" Both paper and discussion will be found *in extenso* at the commencement of this week's *Record*. The discussion was particularly interesting and of great length, and at its conclusion Mr. MCINTOSH moved a hearty vote of thanks to Mr. Spencer, coupling with it the name of Colonel Brittlebank. The accordance of this was followed by a similar recognition of the services of those Fellows who had furnished *post-mortem* specimens, and the meeting concluded with a vote of thanks to the President for his conduct of the meeting.

J. F. MACDONALD, Hon. Secretary.

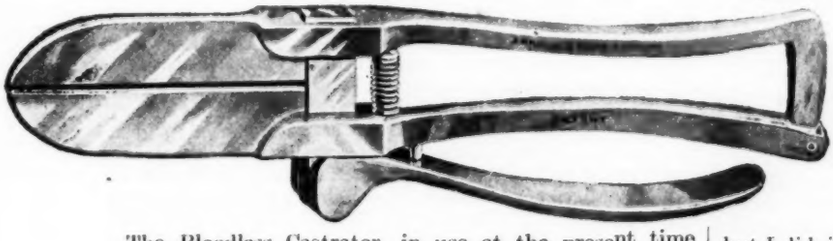
"While Captain Audas, Veterinary Inspector of the Darfur Province, was travelling the same way in charge of some Government horses, the lion sprang out and attacked the horses, killed one, and scattered the others. Before it could do any further damage, Captain Audas brought the lion down with a well-directed bullet, to the intense delight of the villagers of Niala."

Veterinary Inspection in Mines.

Mr. Shinwell (Secretary of Mines) informed Mr. Clarke in the Commons recently that it was not his intention to appoint a number of extra horse inspectors for the mines. The appointment of additional inspectors of coal mines that he was about to make would naturally lead to increased inspection of horses and their working conditions. Moreover, he was considering the temporary appointment of a veterinary surgeon to visit collieries and look into the present arrangments for the protection of horses underground from over-work and ill-treatment.

Meat Trades and Tuberculin.

At the bi-annual conference of the Scottish Federation of Meat Traders' Associations, held at Perth, on April 9th, an Edinburgh delegate said with regard to the question of compensation for confiscation that the Ministry of Agriculture had given it as their opinion that confiscation was a trade risk, but he did not consider that that was the case. He thought the matter should be reconsidered, and it made compulsory that all cattle sent into the market should be subject to tests. Mr. A. J. Scott said it was this question which had brought the National Federation into being. A good deal of the trouble was caused by tuberculosis, and in that connection he considered they must do something to stop the abuse of tuberculin, and must join hands with the veterinary profession to standardise tuberculin. By its misuse they were being cheated by the sellers. The question was left in the hands of the executive.



The Bloodless Castrator in use at the present time requires considerable effort in use, and when it is to be used for a number of animals the manual efforts required become of considerable moment; moreover there is said to be a disadvantage with such an instrument, as the operator has to grasp the handles when in an approximately vertical position. After two years' experimental work, Arnold and Sons, of 52 Wigmore Street, W.1, have produced and patented a castrator on an entirely new principle. It is of simple construction, is used in a horizontal position, instead of vertical, which it is claimed is of the greatest advantage to the operator, and it possesses a greater advantage of leverage. The instrument is made in two sizes.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

The "Record's" Editorials of 22nd March and 12th April, 1924.

To the Editor of the Veterinary Record.

Sir,—If in the following lines I have freely to make use of the second personal pronoun, I hope it is unnecessary to assure you it is nothing more than the unavoidable counterpart of the editorial "we," and that nothing is further from my mind than the vulgarity of personalities.

May I in the first place remind you of the citizen who boarded a battleship and sent word to the captain that one of his owners desired to see him. In the same sense I may claim with many others to be one of your owners, with full right at least to hold and express an opinion on what should be the broad principles upon which a journal should be run, when it purports to be the profession's journal, and depends for its existence on funds subscribed by individual members of a profession.

The clientèle of such a journal consists of educated professional men, and while its columns should be open to the freest expression of honest and responsible opinion by individuals, the duty of the editorial column should be limited to giving as impartially as possible full information on every side of a question. It should avoid the rôle of a party organ, and even more scrupulously refrain from organised or other forms of personal attack on members of the profession. Any other attitude on the part of the *Veterinary Record*, I venture to say, is destined to incite internecine warfare, with its obvious consequences, in a small profession which may acquire force from unity, but will never do so from numbers.

In your issue of the 22nd March, the editorial made statements which were liable to mislead, and I thought it only fair to the profession, whom I assumed, from your columns, to be seriously interested in the subject, that the true position should be put before it, in order that it might make up its own mind on the facts, and not be dependent on what had the appearance of editorial propaganda. I invite anyone who is interested to read your editorial of 22nd March and my letter in the issue of the 29th, and to ask himself if the former is a full and accurate statement of the case. My letter did not accuse you of wilfully misleading. You will find, if you refer to my letter, that "mislead" was qualified by "however unintentionally," but I did, in effect, invite the *Veterinary Record* to explain how, with all the facts in writing before the nominal editor, as well as the information derived from his position on the Council, the *Veterinary Record* came to publish to the profession, on an important subject, an article so defective. You have not accepted the invitation, and merely say you are not concerned with any statements made to the Royal College of Veterinary Surgeons. The *Veterinary Record* knew perfectly well what these statements were, because the nominal editor was present as a member of the Committee, and it savours of humbug to imply that they were not known. They represented the view of the Ministry of Health, which the Association owning the *Veterinary Record* had also received. Your only reply is to imply that I have broken confidence by saying something which was said at a Committee meeting. I do not see what that has to do with the matter raised,

except that it seems an admission of knowledge, but I must ask you if you seriously mean to claim that the reason for Committees is secrecy ? Surely the main reason is expedition, aided by informality. Committees may present only their findings to the main body, but surely the main body, in open council, and the profession also, for that matter, are entitled, having regard to the fact that the reasons therefor are even more important than the findings themselves, to ask, and they often do ask, the reasons upon which the findings were based. But, Mr. Editor, supposing you are correct in this irrelevant statement—which I do not suppose—are you really claiming that you may sit on a Committee sworn to secrecy, by your way of it, at least, and yet write publicly on the matter, because you do not do so as a member of a Committee, but as an editor ? You have the great advantage of your journalistic accomplishments, which we outsiders have not ; you have the editor's privilege of the last word ; you may express your editorial thunder in majuscule, whilst we poor mortals may only whisper in minuscule, but nobody will accord to you this novel advantage, claim it as you may. You must be aware that nobody has ever said otherwise than the obvious, that the Therapeutic Substances Bill could control the quality of tuberculin, and that if the authorities decided to do so, it would be open to veterinarians, if they liked, to purchase such tuberculin. You did not explain, however, that while several constantly reliable brands of tuberculin are already available, the hope of discovering a practical method of standardising tuberculin is, from its nature, very hypothetical, and is certainly not in the present, but in the future. Nor have you referred to the view that many of the disappointments in tuberculin testing of herds arise from causes other than the brand of tuberculin. It is idle to pretend that the interest of the profession is centred on something which the Bill can actually give, if and when a practical method of standardising becomes available, for, as explained in my previous letter, tuberculin is used in human medicine as well as in veterinary medicine. The interest was undoubtedly centred on control of the sale of tuberculin, and so far as I am aware, nobody has dissented from the principle. My letter, which seems to have aroused editorial ire, was written, as stated therein, with the perfectly legitimate object of making it clear to the profession what I think your editorial should have done, that failure to get the control of sale of tuberculin inserted into the Therapeutic Substances Bill was inevitable, because it involved the Ministry of Health changing an agreed measure, or non-contentious Bill, into the reverse, with the consequences which anyone with an elementary knowledge of Parliamentary procedure knows that to connote.

In the later issue of 12th April, your editorial makes a personal attack on myself, and breaks out in a new place, the standardization of biological products and other substances in general. Obviously it cannot matter to me personally if veterinary practitioners desire such a thing, having been frankly told what they are being invited to support. I happen to be in charge of the manufacturing of certain sera and other such articles on a very large scale. I may therefore claim some practical acquaintance with the subject, and would be blameworthy if I did not put it before the profession, as the *Veterinary Record* should have done, to enable the profession to decide for itself. It is well known to those who manufacture sera that the clear yellow product obtained by clotting gives a yield of 20 per cent. less than the method of defibrinating followed by centrifuging. The latter product is negligibly less potent than the former, but it is more or less deeply coloured by hæmoglobin, and is rejected for use in human medicine. With the much higher yield it is obviously cheaper than the former product, and why should it be rejected on a human standard for use by a profession which must constantly consider the commercial side of practice ? Further, the adoption of a rigid human standard for sera, and for that matter, for certain drugs, means that large quantities of usable material have to be rejected as below standard, with consequent increase of cost of the standard product. I take it you have not in mind the adoption of two standards, since you object to a label "Veterinary," which would inevitably result, but if you had such a thing in mind, you must have overlooked what the Ministry of Health said, that the avowed intention of the Bill was only to control the quality of substances used in human medicine. For obvious reasons, as I said in my previous communication, I cannot discuss the Ministry of Agriculture.

As regards the attack on myself, I do not accept that you represent the profession, and I leave it to judge whether you have displayed the same perspicacity in your estimate of myself as you have shown in the other matter. It may be, however, that your editorial, as it applies to myself, does represent the opinion of the National Veterinary Medical Association of Great Britain and Ireland. If so, one of two courses is open to me and my likes (to use a Scotticism). We may concur automatically in everything the Editor of the *Veterinary Record* says, and the way it is put before us, including ways and means for carrying it into effect. I am not prepared to adopt this course. Alternatively, we may conclude we have overstayed our welcome, and resign from the Association. This course I am prepared to take, on the assurance that the tone of your editorial represents the Association, and not merely an opinion of an editorial caucus.

As stated in the first instance, my sole object was to have these important matters put before the profession in all their aspects, and having tried to do so, I now leave it to them, but cannot conclude without referring to the latter part of your editorial, which seems to me gratuitous, and liable to mislead. It says :—"We have before drawn attention to our regret that the Ministry of Agriculture has not placed itself in closer touch with our profession and been more sympathetic with it, through the medium of its Chief Veterinary Advisor. This Association and its Divisions has given the latter very generous support in the anxious and troublesome times through which he has lately passed, and we should like to have seen a little reciprocity." The facts are as follows :—

I came to the meeting at a very busy time, by pressing invitation, to put the position before it. I did not come with the intention of receiving support, nor would I have expected the meeting to accord support which was not in the fullest agreement with its convictions, but it would be incorrect, and ungenerous, on my part if I did not say that I was profoundly moved by, and appreciative of, the speeches which were made by certain gentlemen who were present. Whatever may be their convictions on this or that subject, I know them to be chivalrous gentlemen, and I wish to say here that it is a libel on those gentlemen to imply that they spoke with the slightest intention that I should return a *quid pro quo* in the form you say you expected, on a subject of importance to the profession, which when carefully analysed is obviously open to be viewed from more than one angle.

I apologise for the length of this communication, which has had to deal with many points raised by your editorial, and I ask you in all fairness to find space to publish it in its entirety in your next issue.—Believe me, yours truly,

S. Stockman.

April 19th, 1924.

The Humanity of Methods of Slaughter.

To the Editor of the Veterinary Record.

Sir,—I, for one, am delighted to observe that Mr. Linton has found time to make a closely reasoned reply to Professor Leonard Hill on the subject of the humanity of methods of slaughtering.

No doubt many experienced veterinary practitioners have read with astonishment Professor Hill's statements, and there are, no doubt, many who, like myself, felt that some public reply should be made. Mr. Linton is dealing ably with the matter.

The question of physical pain is important, but Professor Hill has shown that it is open to subtle argument.

The question of mental agony is far more important and is open to no argument at all.

If Professor Hill is an experienced observer of animal psychology, he should know that the intelligence of a domesticated animal is nearly equal to that of an adult human being in respect of apprehension of mortal injury and death. His comparison with the intelligence of a baby is based on insufficient acquaintance with animals. If his studies have been physiological, he should know that the cerebrum of animals is on the whole not susceptible to paralysis of function, and consequently that unconsciousness is not nearly so readily produced as in man.

My observations, and they have been considerable, convince me that unconsciousness in animals is by no means instantaneously produced by cutting the throat; there is, subsequent to the operation, a considerable period of agony and terror, that together constitute the greatest torture which it is in the power of man to inflict. We are not justified in subjecting animals to torture for no better reason than that, in the opinion of some experts, the flesh may "keep" slightly better.

I am no sentimentalist, but find it difficult to understand the mental attitude of a man who would set in the balance against animal suffering a shade of difference in the hygienic quality of meat. One of the few incidents of my professional service in the Fiji Islands of which the recollection affords me any gratification was that of being able to persuade the authorities of the Colony to pass a law that no animal should be slaughtered without previously being stunned. The method adopted was shooting. Up to that time the custom was to immobilise the animal for purposes of bleeding by pithing, and it was my frequent observation of half-successful efforts to effect this operation which roused me to action.

The only certain instantaneous means of killing an animal is shooting, and no civilised nation should permit domesticated animals intended for human food to be slaughtered in any other way.—Yours, etc., J. W. RAINEY, C.B.E., M.R.C.V.S., F.Z.S.

34 Chester Terrace, Regent's Park, N.W.1.
April 19th, 1924.

Milk Special Designations Order: Lanarkshire Scheme.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—As one of the Lanarkshire practitioners, I have to thank the members of the North of Scotland Division for their interesting discussion on the serious position of practitioners in this county. I had the favour of opening the discussion at Glasgow and of stating my views on the panel system. The farming community are in favour of helping their own private practitioner, and at a meeting of the Lanarkshire Branch of the National Farmers' Union the following resolution was passed (4th April, 1923):—

"That this meeting are strongly of the opinion that all members of the Royal College of Veterinary Surgeons practising in the county of Lanark should be approved by the County Council as persons entitled to examine herds under the Milk and Dairies Act and relative Orders, and that their certification should be sufficient for the issue by the Council of certificates under the Act for the sale of Grade A and Certified Milk." (Vide *Veterinary Record*.)

This is the only panel system which has ever been suggested in place of the present scheme. A country practitioner in Lanarkshire is entirely dependent on private practice. I agree with the points raised by Mr. Kerr in his able paper.—JAMES F. TAYLOR, M.R.C.V.S.

Cathkin, Rutherglen.
April 18th, 1924.

The Editor begs to acknowledge the receipt of the following:—

Communications from Messrs. G. F. Boddy and L. T. Whitby.

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